PREDICTORS OF HOSPITALIZATION IN HEART FAILURE PATIENTS

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SUMR 2014
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AGENDA

I. Background in Heart Failure (HF)
II. Significance of HF Self-Care Research
III. Symptoms of Fluid Retention Study
IV. Diuretic Adherence, Diet and Fluid Intake Study
V. My Role as a Research Assistant
VI. Lessons Learned
I. BACKGROUND IN HEART FAILURE

The normal heart has strong muscular walls which contract to pump blood to all parts of the body.
I. BACKGROUND IN HEART FAILURE

Heart failure is a chronic, progressive condition in which the heart muscle is unable to pump enough blood to meet the body's needs for blood and oxygen.
I. BACKGROUND IN HEART FAILURE

- As blood flow out of the heart slows, blood returning to the heart backs up, causing congestion in the body’s tissues.
I. BACKGROUND IN HEART FAILURE

• Lack of blood being supplied to the body **compromises vital organs:**
  ▫ Kidneys’ ability to dispose of sodium and water decreases.
  ▫ Digestive system’s actions decrease as well.

• The lack of blood supply and congestion in the body’s tissues cause the **symptoms of heart failure:**
  ▫ Sudden weight gain
  ▫ Swelling of feet, ankles, legs
  ▫ Loss of appetite
  ▫ Swelling in the belly
  ▫ Pulmonary Edema - tiredness and shortness of breath
II. SIGNIFICANCE

- PREVALENT
- COMPLEX
- COSTLY
II. SIGNIFICANCE

According to the American Heart Association:

- HF is the **leading cause of hospitalization in adults >65 years of age.**

- **One in four HF patients is readmitted to the hospital within 30 days,** and almost **half** are readmitted within **6 months.**

- HF is the **most expensive condition billed to Medicare,** exceeding **$17 billion annually.**
The prevalence of HF in the US is estimated to increase...

Prevalence of HF in the US Population

Heidenreich, PA, Albert NM, Allen LA, et al. Forecasting the impact of Heart Failure in the United States: A Policy Statement from the AHA. April 24 2013
... and so are the associated costs!

Heidenreich, PA, Albert NM, Allen LA, et al. Forecasting the impact of Heart Failure in the United States: A Policy Statement from the AHA. April 24 2013
How can we reduce hospital readmissions?

• Most of the **day to day care** is done by the **patient at home**.
  - **Self-care maintenance** - physiologic stability.
    - i.e: take medications, maintain a low sodium diet
  - **Self-care management** - respond to symptoms when they occur.
    - i.e: Diuretic titration, calling the doctor

• **HF self-care is poor**, but the literature shows that better self-care can improve HF outcomes
Understanding self-care patterns and identifying those associated with better outcomes is a priority in research...

Two prospective cohort studies that look at patterns in HF self-care:

- **Symptoms of Fluid Retention**
  - Describe how HF patients detect, interpret, and manage their symptoms of fluid retention.

- **Balancing Diuretics, Diet and Fluid Intake to Predict Hospitalization in HF Patients**
  - Describe how patterns in diuretic adherence and sodium/fluid intake interact to predict readmission of recently discharged HF patients.
III. SYMPTOMS OF FLUID RETENTION STUDY
1. Study Design:

Matching data from ICD and daily symptom diary

Symptoms of Fluid Retention Study

Detect Symptoms

Interpret Symptoms

Manage Symptoms

Symptom Monitoring Behaviors

- Demographic factors
- Clinical factors
- Cognitive factors
- Decision-making capabilities

Bi-weekly phone interviews
2. Methods:

I. Recruitment and Telephone Screening:
- HF patients with an ICD and taking a loop diuretic

II. Enrollment & Baseline Data Collection:
- Socio-demographic
- Medical record review
- Class of HF
- Medications
- Self-care of HF
- Depression
- Cognitive capabilities
- Decision-making capabilities

III. Bi-weekly follow-up:
- Symptom monitoring behaviors
- Interpretation of signs and symptoms
- Clinical events

IV. Final Data Collection:
- Medications
- Self-care of HF
- Depression
- Cognitive capabilities
- Decision-making capabilities

Enrollment Home Visit
Month 1 Mail in Diary
Month 2 Mail in Diary
Month 3 Home Visit
3. What can we expect to find?

1. We expect the following **factors** to be associated with **less accuracy** in detecting symptoms of fluid retention:

<table>
<thead>
<tr>
<th>Demographic</th>
<th>Clinical</th>
<th>Cognitive</th>
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<tbody>
<tr>
<td>Older age</td>
<td>Shorter time with HF</td>
<td>Reduced cognitive performance</td>
</tr>
<tr>
<td>Male gender</td>
<td>More severe HF</td>
<td>Reduced decision-making capabilities</td>
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<tr>
<td></td>
<td>Multiple chronic conditions</td>
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<td></td>
<td>More number of symptoms</td>
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<td></td>
<td>Greater variability in usual symptoms</td>
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</tbody>
</table>
3. What can we expect to find?

2. We expect that patients who engage in symptom monitoring behaviors will have higher accuracy in detecting symptoms of fluid retention.

- BUT engaging in symptom monitoring behaviors will not necessarily be associated with better management of symptoms.
IV. BALANCING DIURETICS, DIET AND FLUID INTAKE TO PREVENT HOSPITALIZATION IN HF PATIENTS
1. Study Design:

Medication Electronic Monitoring System (MEMS)

Diuretic Usage

Dietary Sodium

Fluid Intake

Types of Adherence

Hospitalization

- Demographic factors
- Clinical factors
- Cognitive factors

• Bi-weekly phone interviews
2. Methods:

I. Recruitment and Screening:
- Patients hospitalized for an acute HF exacerbation
- Discharged with a loop diuretic

II. Enrollment & Baseline Data Collection:
- Socio-demographic
- Medical record review
- Medications
- Fatigue
- Sleep quality
- Cognition
- Dietary sodium

III. Bi-weekly follow-up:
- Dietary sodium
- Fluid intake
- Clinical events

IV. Final Data Collection:
- Medications
- Fatigue
- Sleep quality
- Cognition
- Dietary sodium
- Fluid intake
- Clinical events

Enrollment Home Visit

Month 1

Month 2

Month 3 Home Visit
3. What can we expect to find?

1. *Focusing on diuretic use will be a powerful predictor of hospitalization.*

   - Because of the known **variability in the use of diuretics**, in order to validate the predictive model proposed in the HF medication adherence pilot study we need to test if the variables that were significant **predictors of hospitalization** are also significant for diuretic adherence.

   - We will also be looking at the variables that were significant **predictors of HF medication non-adherence** in the pilot study.
3. What can we expect to find?

2. **Considering the balance between diuretic adherence patterns, dietary sodium and fluid intake will be key.**

- Studies have shown that without stable sodium and fluid intake balanced with consistent diuretic use, fluid retention and ultimately hospitalization are unavoidable.

- **BUT** no previous studies have examined how these elements balance each other off.
Diuretics, Diet and Fluid Intake Study

- Consistent Diuretic Use
- Poor Diuretic Use
- Stable Sodium and Fluid Intake
- Low Sodium and Fluid Intake
Diuretics, Diet and Fluid Intake Study

- Poor Diuretic Use
- Low Sodium and Fluid Intake
V. MY ROLE IN THESE STUDIES

1. Reviewed the project setup
   ▫ Assembled enrollment packets for patients in both studies.
   ▫ Reviewed the electronic database setup (REDCap).

2. Recruited and screened study participants.
   ▫ Over the telephone and in the hospital.
   ▫ Explained and obtained informed consent.

3. Data collection and management.
   ▫ Administered standardized tools for baseline data collection.
   ▫ Conducted bi-weekly phone interviews.
   ▫ Data entry in REDCap.

4. Participated in weekly team meetings.
   ▫ Discussed journal articles on current heart failure research.
   ▫ Discussed specific cases where inclusion/exclusion criteria were unclear.
VI. LESSONS LEARNED

1. Research Methodology
   - Grant submissions.
   - Study designs.
     - Types of research studies.
     - Choosing the appropriate standardized tools for data collection.
     - Accounting for all effect modifiers and confounders.
   - Set a system for both paper and electronic data management.
   - Ethics in research.
VI. LESSONS LEARNED

2. Clinical Skills
   ▫ Pathophysiology of heart failure and associated medical conditions.
   ▫ Navigation of electronic medical records and clinical charts.
   ▫ Patient communication and interviewing skills in both the hospital and home setting.
VI. LESSONS LEARNED

3. Personal Discovery

- Reassured my desire to pursue an MD
- Encouraged my interest in healthcare delivery systems:
  - Promote and improve self-management of disease to improve patients’ quality of life and to prevent excessive healthcare utilization.
  - Provide continuous and integrated care, either home-based or in the outpatient clinic, in order to both improve the quality of care and reduce healthcare costs.
AKNOWLEDGEMENTS

- Dr. Barbara Riegel
- Julia Hill
- Joanne Levy
- Safa Browne and the LDI time.