MICHIGAN STATE UNIVERSITY | College of Nursing

Interventional designs in heart failure studies using home telehealth to reduce hospital admissions.

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Background

- Home Telehealth Monitoring (HTM) is gaining momentum to prevent HF hospital admissions
- Growth of HTM is expected to go from 2.2M in 2012 to 4.9M patients worldwide by 2016

Problem

- Studies of the efficacy of HTM for reducing HF admissions aren't strong or consistent
- Interventional designs: choices in study protocols intended to have a causal effect
- Study results are difficult to compare, due to interventional design differences
- **The optimal design of HTM programs to prevent HF admissions is unknown**

Objectives

- To identify the interventional design components of randomized control studies that used HTM
- To describe effective combinations of interventional design component for reducing HF admissions

Methods

- A systematic literature review was conducted using PubMed, EBSCO, and CINAHL
- Key words: heart failure and telehealth, telemonitoring, telemedicine and remote patient monitoring
- English language clinical trials published from August 2004 to August 2014 were reviewed
- Included: HTM, compared data regarding hospital admissions, hospitalizations or readmission rates

Results

Of 169 articles identified, 18 met the criteria for inclusion. Three studies showed consistent, significant results in reducing hospital admissions.

Frequency of provider availability for review

- In the studies with significant results:
  - One study had 24/7 coverage for telehealth data review.
  - The second had 24/7 RN availability, with a cardiologist on call
  - The third did not specify the availability of providers for data review.

Home Telehealth Monitoring Cycle

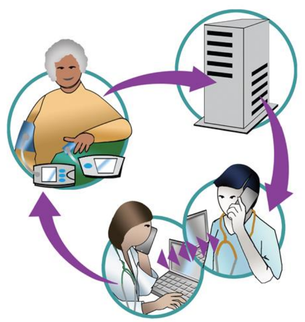

Illustration 1:
- The patient uses the HTM to enter data
- The data is transmitted to a server
- Data is sorted and flagged.
- The data is sent to the patient's EMR.
- Flagged data is sent to care provider
- Care providers review flagged data
- May directly contact the patient
  - Provide patient education
  - Adjust therapy
- The patient continues to enter data to monitor their health using HTM.

Illustration 1 *Property of the author and courtesy of Polo Designs, lmpolo@aol.com*

Types of data monitored in studies (by percent):
- Weight (72.2%)
- Symptom ratings and blood pressure (55%)
- Heart rate (33.3%)
- EKG (22.2%)
- Queries related to health behaviors (22.2%)
- Pulse oximetry (11.4%)
- Data from electronic medication dispensers (5.5%)
- Queries related to functional status (5.5%)
- Queries related to health status. (5.5%)

Frequency of patient data input
- Daily (89.9%)
- Twice daily (5.5%)
- Weekday (5.5%)

Frequency of provider data review

Daily (27.8%)
24/7 (27.8%)
Weekdays (5.5%)
MWF, no holidays (5.5%)
Did not specify (33.3%)

Results, continued

Duration of HTM

- Among the 18 articles, the duration of HTM was from 3 to 24 months (mean 7.85 months, std dev 5.13) .
- The studies with significant findings had interventional durations of 3 and 12 months. (mean 9.0 months, std dev 5.19).
- No assumptions regarding optimal intervention duration can be drawn from this data.

Type and frequency of data entered

- Two studies with consistent, significant reductions in hospital admissions monitor symptom questions and weight (Giordano, Scalvini, Zanelli et al., 2009)(Weintraub, Gregory, Patel et al.).
- The third study monitored self-rated symptoms, self-care practices and medication compliance(Dansky & Vasey, 2009).
- Six studies reported on patient data input, which varied from 55% to 97%.
- All studies reporting reduced admissions used daily input of patient data

Conclusions

- HTM has not significantly reduced hospitalizations in the literature with any consistency
- Two studies with significant findings included heart rate monitoring
- Daily symptoms monitoring and heart rate monitoring should be included when planning a HTM program in the clinical setting

Implications

- The three studies that consistently reduced hospital admissions for HF patients monitored daily symptom ratings and had daily provider monitoring of data.
- More research in indicated to determine optimal designs of HTM programs to reduce admissions in HF patients.