Improving Outcomes of Patients and Caregivers in Chronic Disease: Dyadic Approach

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Professor, Co-Director of the RICH Heart Program
College of Nursing
University of Kentucky,
Funding Sources

• ‘Rural Intervention for Caregivers’ HeartHealth’ NINR R01; Multi-PI (2016-2021; $2.6 million)

• ‘Effects of Family Sodium Watchers Program on Outcomes in Heart Failure Patient-Family Caregiver Dyads’ NINR R01; PI (2014-2019; $2.4 million)

• ‘Corazón de la Familia (Heart of the Family)’ NINR R01; Co-I (2017-2022; $2.5 million)

• ‘Reducing Health Disparities in Appalachians with Multiple Cardiovascular Disease Risk Factors’, PICORI Co-I (2013-2016; $2.1 Million)

• ‘Sodium Watcher Program for Adults with Heart Failure’ AHA National Innovative Research Grant, PI (2009-2010; $150,000)

• ‘Impact of Family Distress and Burden on Patients Outcomes in Heart Failure’ NIH/NINR K23; PI (2006-2009; $280961)
Dr. Debra K. Moser, PhD, RN, FAAN, FAHA
Inductee of the STT International Nurse Researcher Hall of Fame

• Professor
• *Rural Intervention for Caregivers’ HeartHealth*
  NINR R01; Multi-PI (2016-2021)


• ‘Biobehavioral cardiovascular health promotion intervention in a state prison system’. PI: NINR (2009-2012)
Dr. Terry A. Lennie, PhD, RN, FAAN, FAHA
Inductee of the STT International Nurse Researcher Hall of Fame 2015

• Professor, Senior Associate Dean for Graduate Faculty Affairs

• ‘Nutrition intervention to reduce symptoms in patients with advanced heart failure’, NINR R01 (2011-2016)

• ‘BMI, nutrition, inflammation, and heart failure outcomes’, PI: NINR (2005-2009)
Overview of Program of Research

• Evidence of family support in improving outcomes of patients with heart failure
• Evidence of interdependence relationship between patients and their family caregivers
• Dyadic (patients and family caregiver) intervention program to improve adherence to sodium restricted diet
Heart Failure (HF)

- Increasing prevalence of HF in worldwide
  - > 26 million people living with HF in worldwide
  - 17-45% of patients admitted to hospital with HF die within 1 years of admission

- The United States
  - > 6.5 million adults (>20 years of age) had HF
  - HF cases per year > 1 million admissions yearly
  - Mortality rate is 50% within 5 years of diagnosis

Ponikowski et al. 2014 Heart failure - ESC;
Benjamin et al. 2017, Circulation;135:e146-e603
Family Caregivers in Heart Failure.

- Family members are the primary support person in HF patients’ self-care and disease management.

- Positive and highly supportive care from family members is associated with patients’ engagement in self-care including medication adherence, dietary adherence, and daily weighing.

A review of 122 studies from 1948 to 2001

Strong association between family support and adherence to treatment regimens

- Practical social support (e.g. instrumental support, assistance, reminders, organization, support for specific behaviors) has highest impact on adherence
- Family cohesiveness (e.g. warmth, closeness, acceptance) and family conflict are associated with adherence
Depressive Symptoms in Patients with Heart Failure

<table>
<thead>
<tr>
<th>All patients with heart failure in 27 studies</th>
<th>Range</th>
<th>Overall prevalence</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>9 - 60%</td>
<td>21.5%</td>
</tr>
</tbody>
</table>

- Depressive symptoms are a well known predictor of mortality and morbidity in HF
  - 3 times greater risk of readmission
  - 2 times greater risk of death
Marital Status as an Independent Predictor of Event-Free Survival of Patients With Heart Failure

By Misook L. Chung, RN, PhD, Terry A. Lennie, RN, PhD, Barbara Riegel, RN, DNP, Jia-Rong Wu, RN, PhD, Rebecca L. Dekker, RN, MSN, and Debra K. Moser, RN, DNSC
### Event-free Survival (death & cardiac admission)  
(N=166)

<table>
<thead>
<tr>
<th>Variables</th>
<th>HR</th>
<th>95% CI</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>1.01</td>
<td>.98 – 1.04</td>
<td>.54</td>
</tr>
<tr>
<td>Gender (female)</td>
<td>1.47</td>
<td>.37 – 1.54</td>
<td>.22</td>
</tr>
<tr>
<td>Education ≤ high school</td>
<td>0.82</td>
<td>.78 – 2.85</td>
<td>.48</td>
</tr>
<tr>
<td>Finance: Having enough</td>
<td>0.59</td>
<td>.28 – 1.23</td>
<td>.16</td>
</tr>
<tr>
<td></td>
<td>0.89</td>
<td>.38 – 2.10</td>
<td>.80</td>
</tr>
<tr>
<td>Ejection fraction</td>
<td>0.98</td>
<td>.97 – 1.00</td>
<td>.06</td>
</tr>
<tr>
<td>NYHA III</td>
<td>1.17</td>
<td>.60 – 2.26</td>
<td>.65</td>
</tr>
<tr>
<td>IV</td>
<td>0.99</td>
<td>.43 – 2.25</td>
<td>.97</td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Depressive symptoms (BDI-II&gt;13)</td>
<td>3.68</td>
<td>1.40 – 9.69</td>
<td>.008</td>
</tr>
<tr>
<td>Not married (44%)</td>
<td>3.86</td>
<td>1.76 – 8.48</td>
<td>.001</td>
</tr>
<tr>
<td>Depressive symptoms x marital status</td>
<td>0.37</td>
<td>.12 – 1.15</td>
<td>.09</td>
</tr>
</tbody>
</table>

Full model  \( p = .006 \)

Chung et al. *AJCC* 2009:18:562-570

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*Note: HR stands for Hazard Ratio.*

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*Note: CI stands for Confidence Interval.*
Table 1: Multivariable Analysis of Event-free Survival (death & cardiac admission) (N=166)

<table>
<thead>
<tr>
<th>Variables</th>
<th>HR</th>
<th>95% CI</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>.101</td>
<td>.98 – 1.04</td>
<td>.48</td>
</tr>
<tr>
<td>Gender (female)</td>
<td>.147</td>
<td>.77 – 2.55</td>
<td>.28</td>
</tr>
<tr>
<td>Education ≤ high school</td>
<td>.90</td>
<td>.51 – 1.58</td>
<td>.90</td>
</tr>
<tr>
<td>Finance: Having enough</td>
<td>.60</td>
<td>.28 – 1.28</td>
<td>.18</td>
</tr>
<tr>
<td></td>
<td>Not having enough</td>
<td>1.05</td>
<td>.47 – 2.46</td>
</tr>
<tr>
<td>Ejection fraction</td>
<td>.99</td>
<td>.97 – 1.00</td>
<td>.10</td>
</tr>
<tr>
<td>NYHA III</td>
<td>1.13</td>
<td>.58 – 2.18</td>
<td>.72</td>
</tr>
<tr>
<td>IV</td>
<td>1.03</td>
<td>.45 – 2.36</td>
<td>.95</td>
</tr>
<tr>
<td>Depressive symptoms (BDI-II &gt;13)</td>
<td>1.96</td>
<td>1.01 – 3.81</td>
<td>&lt;.05</td>
</tr>
<tr>
<td>Not married (44%)</td>
<td>2.48</td>
<td>1.38 – 4.43</td>
<td>&lt;.01</td>
</tr>
</tbody>
</table>

Full model  p = .0062  Chung et al. AIJC 2009:18:562-570
Depressive symptoms and poor social support have a synergistic effect on event-free survival in patients with heart failure.
Event-free Survival: Depressive symptoms + Perceived social support (PSS)

- No depressive symptoms + High PSS
- Depressive symptoms + Low PSS
- No depressive symptoms + Low PSS
- Depressive symptoms + High PSS

\[ \text{EXP (B) } = 1.80, \ P = 0.04 \]

\( p = .03 \)

- Depressive symptoms (BDI-II >13)
- High perceived social support (PSS; MPSSS>71)

Chung et al., Heat & Lung, 2011

(N=220)
Depressive Symptoms of Caregivers in Heart Failure

- Depressive symptoms are a substantial psychological problem in family caregivers of HF patients

<table>
<thead>
<tr>
<th>Researcher</th>
<th>Sample (size)</th>
<th>Prevalence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phil et al.</td>
<td>Spousal caregiver (n=47)</td>
<td>34%</td>
</tr>
<tr>
<td>Martensson et al.</td>
<td>Spousal caregiver (n=48)</td>
<td>41%</td>
</tr>
<tr>
<td>Schwarz &amp; Elman</td>
<td>Family caregivers (n=156)</td>
<td>21%</td>
</tr>
<tr>
<td>Chung et al.</td>
<td>Family caregiver (n=109)</td>
<td>28%</td>
</tr>
</tbody>
</table>
Theory of Emotional Contagion

Both positive and negative emotions, mood and distress are contagious and are easily transferred from person to person in close interpersonal relationships.

Coyne J Abnom Psychol 1979; Goodman & Shippy Aging Ment Health 2002
Interdependence Theory

Interdependence is the way interacting partners influence each other’s outcomes

Kelley & Thibaut, 1978; Lewis et al, 2006; Rusbult & Van Lange, 2001
Actor-Partner Interdependence Model (APIM)

Predictors

PATIENTS
Depressive symptoms

CAREGIVERS
Depressive symptoms

Outcome

PATIENTS
Quality of Life

CAREGIVERS
Quality of life

Actor effect

Partner effect

Kenny et al. (2006). Dyadic data analysis
Depressive Symptoms in Dyads

(N=102 dyads)

Higher scores indicate higher levels of depressive symptoms

- Paired t-test: $p = .21$
- Chi-square: $p = .219$
- PHQ > 9: depressed

<table>
<thead>
<tr>
<th></th>
<th>Patients</th>
<th>Caregivers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Depressed</td>
<td>23 (22.5%)</td>
<td>20 (19.6%)</td>
</tr>
</tbody>
</table>
Actor and Partner Effects of Depressive Symptoms on Quality of Life

Physical well-being subscale of the SF-12
Actor and Partner Effects of Depressive Symptoms on Quality of Life

- Patient Depressive Symptoms: $B = -1.5, p < .001$
- Patient Emotional Well-Being: $B = -0.37, p < .05$
- Caregiver Depressive Symptoms: $B = -1.2, p < .001$
- Caregiver Emotional Well-Being: $B = -0.24, p < .05$

Emotional well-being subscale of the SF-12
International collaboration in dyadic research


Family support
Overall Diet Quality in Dyads

Total Health Eating Index (HEI) score

HEI high score = better diet quality

Correlation = .706, \( p < .001 \)

American Adults (2011-2012): 58.27

Patients: 58.8
Caregivers: 59.4

Paired t-test \( p = .584 \)
## Comparisons of Diet Quality Within Dyad members-I

<table>
<thead>
<tr>
<th></th>
<th>Maximum points</th>
<th>Adults(^a) M(SD)</th>
<th>Patients M(SD)</th>
<th>Caregivers M(SD)</th>
<th>Paired T-test P-value</th>
<th>Correlation r</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Fruit</td>
<td>5</td>
<td>2.61 (0.11)</td>
<td>2.59 (1.75)</td>
<td>3.02 (1.54)</td>
<td>.123</td>
<td>.445</td>
</tr>
<tr>
<td>Whole Fruit</td>
<td>5</td>
<td>3.52 (0.15)</td>
<td>3.20 (1.89)</td>
<td>3.55 (1.67)</td>
<td>.177</td>
<td>.407</td>
</tr>
<tr>
<td>Total Vegetables</td>
<td>5</td>
<td>3.54 (0.09)</td>
<td>4.00 (1.29)</td>
<td>4.30 (1.12)</td>
<td>.158</td>
<td>.407</td>
</tr>
<tr>
<td>Greens and Beans</td>
<td>5</td>
<td>3.63 (0.16)</td>
<td>3.21 (1.86)</td>
<td>3.19 (1.58)</td>
<td>.920</td>
<td>.600</td>
</tr>
<tr>
<td>Whole Grains</td>
<td>5</td>
<td>2.75 (0.16)</td>
<td>3.85 (3.27)</td>
<td>3.52 (3.02)</td>
<td>.480</td>
<td>.557</td>
</tr>
<tr>
<td>Dairy</td>
<td>5</td>
<td>5.78 (0.13)</td>
<td>5.23 (2.13)</td>
<td>5.98 (2.48)</td>
<td>.141</td>
<td>.077</td>
</tr>
</tbody>
</table>

\(^a\): HEI-2010 scores for Adults (age 18-65) 2011-2012 National Health and Nutrition Examination Survey
Comparisons of Diet Quality Within Dyad Members-II

<table>
<thead>
<tr>
<th></th>
<th>Maximum points</th>
<th>Adults M(SD)</th>
<th>Patients M(SD)</th>
<th>Caregivers M(SD)</th>
<th>Paired T-test P-value</th>
<th>Correlation r</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total protein foods</td>
<td>5</td>
<td>5.00 (0.00)</td>
<td>4.27 (1.14)</td>
<td>4.50 (0.90)</td>
<td>.155</td>
<td>.532</td>
</tr>
<tr>
<td>Seafood and plant proteins</td>
<td>5</td>
<td>3.98 (0.22)</td>
<td>3.66 (1.68)</td>
<td>3.38 (1.74)</td>
<td>.239</td>
<td>.620</td>
</tr>
<tr>
<td>Fatty acids</td>
<td>10</td>
<td>4.92 (0.19)</td>
<td>4.36 (3.28)</td>
<td>4.33 (3.33)</td>
<td>.940</td>
<td>.614</td>
</tr>
<tr>
<td>Refined grain</td>
<td>10</td>
<td>6.36 (0.17)</td>
<td>8.67 (1.82)</td>
<td>8.22 (2.22)</td>
<td>.210</td>
<td>.383</td>
</tr>
<tr>
<td>Sodium</td>
<td>10</td>
<td>4.04 (0.08)</td>
<td>4.10 (3.28)</td>
<td>3.34 (2.93)</td>
<td>.204</td>
<td>.275</td>
</tr>
<tr>
<td>Empty calories</td>
<td>20</td>
<td>12.53 (0.28)</td>
<td>11.35 (6.05)</td>
<td>12.04 (5.19)</td>
<td>.475</td>
<td>.432</td>
</tr>
</tbody>
</table>

a: HEI-2010 scores for Adults (age 18-65) 2011-2012 National Health and Nutrition Examination Survey
Sodium Restricted Diet (SRD) in Heart Failure Management

Heart Failure Society of America Recommend 2000mg to 3000mg sodium intake for typical patient

- Sodium retention related to excess sodium intake is a major precursor to hospitalization and mortality in patients with HF

## Adherence to Sodium Restricted Diet (SRD)

<table>
<thead>
<tr>
<th>Investigators</th>
<th>Sample size</th>
<th>Measure</th>
<th>Adherence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basuray (2015)</td>
<td>N=305</td>
<td>24 hours urinary sodium excretion &lt; 3000mg</td>
<td>48%</td>
</tr>
<tr>
<td>Chung (2015)</td>
<td>N=379</td>
<td>24 hours urinary sodium excretion &lt;3000mg</td>
<td>35%</td>
</tr>
<tr>
<td>Dunbar (2013)</td>
<td>N=117</td>
<td>24 hours urinary sodium excretion &lt;2500mg</td>
<td>22-32%</td>
</tr>
<tr>
<td>Frediani (2013)</td>
<td>N=114</td>
<td>3-days food diary &lt;2000mg</td>
<td>33%</td>
</tr>
<tr>
<td>Van der Wal (2006)</td>
<td>N=501</td>
<td>Questionnaire</td>
<td>79%</td>
</tr>
<tr>
<td>Moser (2005)</td>
<td>N=202</td>
<td>Interview</td>
<td>13%</td>
</tr>
<tr>
<td>Schwartz (2003)</td>
<td>N =128</td>
<td>Interview</td>
<td>75%</td>
</tr>
<tr>
<td>Jaarsma (2000)</td>
<td>N=128</td>
<td>Questionnaire</td>
<td>50%</td>
</tr>
</tbody>
</table>
Factors affecting adherence to SRD

Knowledge and skills: Reading food labels, Alternative food preparation

Emotional distress (i.e., depression)

Severity of illness

Perceived benefit, Efficacy, Perceived control

Age, Gender, Ethnicity

Cognitive impairment

Appetite; Preference of high sodium food; Poor taste of SRD

Family Caregiver

Comorbidities

Severity of illness

Lennie et al. (2008); Bentley et al. (2005); Clark & Dunbar (2003);
## Relationship of Heart Failure Patients’ Knowledge, Perceived Barriers, and Attitudes Regarding Low-Sodium Diet Recommendations to Adherence

Terry A. Lennie, PhD, RN; Linda Worral Carter, PhD, RN; Muna Hammash, MS, RN; Jan Odom-Forren, MS, RN, CPAN; Lynn P. Roser, MSN, RN; Carol S. Smith, MSN, RN; Robin Trupp, MSN, APRN, BC, CCRN, CCRC; Misook L. Chung, PhD, RN; Debra K. Moser, DNSc, RN

### Progress in Cardiovascular Nursing

<table>
<thead>
<tr>
<th>Barriers</th>
<th>Disagree, N (%)</th>
<th>Neutral, N (%)</th>
<th>Agree, N (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>I can find low-salt foods that I enjoy eating.</td>
<td>55 (23.0)</td>
<td>36 (15.1)</td>
<td>148 (61.9)</td>
</tr>
<tr>
<td>There are enough types of low-salt foods to satisfy my appetite.</td>
<td>15 (21.3)</td>
<td>51 (21.3)</td>
<td>138 (57.5)</td>
</tr>
<tr>
<td>I can afford to buy low-salt foods.</td>
<td>36 (14.8)</td>
<td>31 (12.7)</td>
<td>177 (72.5)</td>
</tr>
<tr>
<td><strong>My friends and relatives serve low-salt foods when I visit.</strong></td>
<td>126 (53.8)</td>
<td>39 (16.7)</td>
<td>69 (29.5)</td>
</tr>
<tr>
<td>Other members of my household eat the same low-salt foods I do.</td>
<td>101 (43.7)</td>
<td>18 (7.8)</td>
<td>112 (48.5)</td>
</tr>
<tr>
<td>Following a low-salt diet takes too much time.</td>
<td>104 (57.1)</td>
<td>29 (15.9)</td>
<td>49 (26.9)</td>
</tr>
<tr>
<td>Following a low-salt diet takes too much money.</td>
<td>112 (61.2)</td>
<td>24 (13.1)</td>
<td>47 (25.7)</td>
</tr>
<tr>
<td>Following a low-salt diet is hard to understand.</td>
<td>97 (52.7)</td>
<td>31 (16.8)</td>
<td>56 (30.4)</td>
</tr>
<tr>
<td>Food does not taste good on a low-salt diet.</td>
<td>40 (21.7)</td>
<td>40 (21.7)</td>
<td>104 (56.5)</td>
</tr>
<tr>
<td>Following a low-salt diet is hard to do when I go out to eat.</td>
<td>31 (17.2)</td>
<td>40 (22.2)</td>
<td>109 (60.6)</td>
</tr>
<tr>
<td>Following a low-salt diet is hard to do because I rarely cook.</td>
<td>111 (61.0)</td>
<td>38 (20.9)</td>
<td>33 (18.1)</td>
</tr>
<tr>
<td>Following a low-salt diet is hard to do because I mainly eat convenience foods (TV dinners, canned or boxed foods).</td>
<td>137 (74.9)</td>
<td>21 (11.5)</td>
<td>25 (13.7)</td>
</tr>
</tbody>
</table>
Factors related to nonadherence to low sodium diet recommendations in heart failure patients

- Lack of knowledge
- Eating out
- Cost of low sodium food
- Time to prepare
- Bad taste of low sodium diet
- Having high sodium food as favorites
- Difficulty estimating hidden sodium in prepared food/added during preparation

- Family/friend not serving low sodium meals
- Isolated feeling when family members did not eat low sodium diet together

Bentley et al. (2005) EJCN: 331-334
Adherence to a Low-Sodium Diet in Patients With Heart Failure Is Best When Family Members Also Follow the Diet: A Multicenter Observational Study

- Patients whose family member followed the LSD were **1.6 times more likely to be adherent (24-h Una ≤ 3000mg)** than patients whose family member did not follow the LSD (95% CI: 1.03 - 2.4, \( p = .035 \)).

- If that family member was a **spouse**, patients were **4 times more likely to be adherent** than patients whose spouse did not follow the LSD (95% CI: 1.81 - 8.5 \( p = .001 \)).
Having spouse/living with someone and adherence to SRD

## Recommended Sodium Intake for Healthy Adults

<table>
<thead>
<tr>
<th>Source</th>
<th>Intake Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>World Health Organization</td>
<td>&lt;2000 mg of sodium</td>
</tr>
<tr>
<td></td>
<td>“Healthy adults to prevent chronic disease”</td>
</tr>
<tr>
<td>USDA Guidelines</td>
<td>&lt;2300 mg for American</td>
</tr>
</tbody>
</table>

### Average Intake of Sodium in Milligrams per Day by Age-Sex Groups, Compared to Tolerable Upper Intake Levels (UL)

#### Males (years)
- Average 4,240mg per day

#### Females (years)
- Average 2,980 mg per day

**Data Sources:**
- What We Eat in America, NHANES 2007-2010 for average intakes by age-sex group.
- Institute of Medicine Dietary Reference Intakes for Tolerable Upper Intake Levels (UL).
Dark Sides of Family Caregiving

- 63% higher risk of mortality
- 65% higher risk of cardiovascular disease
- 67% higher risk of hypertension

- Housework
- Depression
- Burden
- Working conflict
- Limited social activities
- Anxiety
- Poor Coping
- Comorbidity
- Difficulty of caregiving tasks
- Transportation
- Poor support
- Lifestyle changes
- Limited social activities
- Poor quality of life
- Managing finances

Hidden Patients or Secondary Patients
Family Sodium Watchers Program (Family SWaP)

• The intervention is designed to improve adherence to a SRD in patients with HF using strategies to:
  • Educate *both patients and family caregivers to eat SRD*;
  • *Use approach of a gradual progressive adaptation* to low sodium food for *both patients and family caregivers*
Barriers to follow LSD

• Lack of knowledge
• Eating out
• Cost of low sodium food
• Time to prepare
• Bad taste of low sodium diet
• Having high sodium food as favorites
• Difficulty estimating hidden sodium in prepared food/added during preparation
• Family/friend not serving
• Isolated feeling when family members did not eat LSD together

Bentley et al. *Heart & Lung*, 2009; 38:121-128
Innovation - Gradual taste adaption approach

- Gradually decrease their appetite for salt
- Adaptation to SRD physically by resetting taste buds and psychologically by changing salt preference level and accepting a SRD with enjoyment

Our approach is the first to involve a gradual taste adaptation to the SRD allowing dyads to achieve a new hedonic level for sodium that both enjoy.
Innovation: Use of Electronic Sodium Monitoring Device

- The first study to use this device for dietary self-management in patient-caregiver dyads.
Innovation: Assessing and analyzing outcomes of the patient-caregiver dyads

• Longitudinal dyadic analysis based on the Actor-Partner Interdependence Model, a novel regression statistical analysis method
Innovation: Delivering the intervention via video conferencing technology

Baseline assessment

Non-adherent (If patient's 24-UNA >3000mg)

Adherent (If patient's 24-UNA <=3000mg)

Baseline

Family SWaP (16 weeks)

Immediate follow up

Long-term follow up

Usual care

Family SWaP (16 weeks)

Immediate follow up

Long-term follow up

Usual care

• 24-hour UNA
• Questionnaire

• 24-hour UNA
• Questionnaire

• 24-hour UNA
• Questionnaire
• Rehospitalization

• 24-hour UNA
• Questionnaire

Intervention:
16 weeks Intervention:
6 weekly education sessions (45 minutes) followed by
5 bi-weekly sessions (15-20 minutes)
Family Sodium Watchers Program (Family SWaP): Pilot study

Changes in Urinary Sodium Excretion: Intervention group

Chung et al. (2014) Circulation:130(22), Suppl2:A16922
Family Sodium Watchers Program (Family SWaP)

Changes in Urinary Sodium Excretion: Control group

Chung et al. (2014) Circulation:130(22), Suppl2:A16922
Summary

• Having supportive family member is beneficial to improve outcomes of patients with heart failure

• Interdependent relationship between patients and their family caregivers impacts on their own as well as their partner’s outcomes.

• Further development of dyadic intervention program is needed to improve outcomes of both patients and their family caregivers.
Thank you