Time Will Tell? Symptom Clusters, Physical Activity, & Quality of Life Over Maintenance Therapy in Children with Acute Lymphocytic Leukemia

Casey Hooke PhD, APRN, PCNS, CPON, FAAN
Marilyn J Hockenberry, PhD, RN, PNP-BC, FAAN
Olga Taylor, MPH
Michael E. Scheurer, PhD, MPH
Audrey Bloomer, RN, BSN, PHN
Jessica Hutter, BS, CCRP;
Pauline Mitby, MPH
Wei Pan, PhD
Speaker Disclosure

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How did study concept start?
Symptom Clusters

• Symptoms occur concurrently – rarely in isolation
• In children & teens with ALL - fatigue, sleep disturbances, & depression have been shown to cluster (Hockenberry et al., 2011)
• Multiple ways to analyze symptom clusters ....
Latent Class Analysis

• An example of a person-centered approach is the use of latent class analysis (LCA);

• LCA uses a categorical approach to classify people into groups whose symptom experience is similar (Conley, 2017)
Physical Activity

• PA – any body movement other than resting
  ➢ Exercise: a subset of PA; is planned, structured, and repetitive

• Skeletal muscle movements of PA are characterized in a child’s play behaviors

• In children & teens with cancer, exercise and PA had a positive impact on fatigue, sleep, quality of life, physical functioning, as well as cognitive function (Baumann et al., 2013; Götte et al., 2014)
Quality of Life

• Cancer symptom severity negatively impacts a child’s QOL.

• In primary study, children with more severe symptoms over the first year of treatment had significantly lower QOL at the beginning of maintenance therapy (Rodgers et al., 2018)
Study Aims

• To examine changes in symptoms and QOL during ALL maintenance in children grouped by symptom cluster

• To explore the influence of PA and symptoms on QOL.
Methods

• Setting
  - Texas Children’s Hospital /Baylor College of Medicine
  - Children’s Minnesota

• Eligibility for this companion study
  - Children ages 3 to 18 when started primary study
  - Without CNS radiation
  - Approaching last cycle of maintenance therapy
  - Spoke English or Spanish

• Two Timepoints
  - BOM: Beginning of maintenance (data from primary study)
  - EOM: Last cycle of maintenance
## Methods: Self-report measures

### Symptom Measures

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Measures</th>
<th>Report</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fatigue</td>
<td>(Hockenberry/Hinds Scales)</td>
<td>Ages 7 – 12, Ages 13 to 18, Parents ages 3 to 6</td>
</tr>
<tr>
<td></td>
<td>CFS – 10 items</td>
<td></td>
</tr>
<tr>
<td></td>
<td>FSA – 14 items</td>
<td></td>
</tr>
<tr>
<td></td>
<td>PFS – 17 items</td>
<td></td>
</tr>
<tr>
<td>Sleep</td>
<td>Adolescent Sleep Wake Scale – 28 item</td>
<td>Ages 13 to 18</td>
</tr>
<tr>
<td></td>
<td>Child Sleep Wake Scale – 24 items</td>
<td>Ages 7 – 12 &amp; Parents ages 3 to 6</td>
</tr>
<tr>
<td>Depression</td>
<td>CDI – 2 27 items (BOM)</td>
<td>Ages 7 to 18</td>
</tr>
<tr>
<td></td>
<td>PROMIS – Pediatric Depression (EOM)</td>
<td>Parents ages 3 to 6</td>
</tr>
</tbody>
</table>

### Functional Measures

<table>
<thead>
<tr>
<th>Measure</th>
<th>Report</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical Activity</td>
<td>Ages 7 to 18, Parents ages 3 to 6</td>
</tr>
<tr>
<td>Godin Leisure Scale</td>
<td></td>
</tr>
<tr>
<td>QOL</td>
<td>Ages 7 to 18, Parents ages 3 to 6</td>
</tr>
<tr>
<td>PedSQL Cancer Module</td>
<td></td>
</tr>
</tbody>
</table>
Latent Class Analysis

• Categorized children into symptom cluster groups (low and high)
• Group assignment based on measurements of fatigue, sleep disturbance, and depression taken at the beginning of maintenance therapy.
<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Whole group N = 42</th>
<th>Low group N = 34</th>
<th>High group N = 8</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Young Child (3 - 6 years)</td>
<td>20 (48%)</td>
<td>17 (50%)</td>
<td>3 (37%)</td>
</tr>
<tr>
<td>Child (7 - 12 Years)</td>
<td>19 (45%)</td>
<td>15 (44%)</td>
<td>4 (50%)</td>
</tr>
<tr>
<td>Adolescent (13 - 18 Years)</td>
<td>3 (7%)</td>
<td>2 (6%)</td>
<td>1 (13%)</td>
</tr>
<tr>
<td><strong>Sex</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>22 (52%)</td>
<td>18 (53%)</td>
<td>4 (50%)</td>
</tr>
<tr>
<td>Male</td>
<td>20 (48%)</td>
<td>16 (47%)</td>
<td>4 (50%)</td>
</tr>
<tr>
<td><strong>Race/Ethnicity</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hispanic</td>
<td>16 (38%)</td>
<td>13 (38%)</td>
<td>3 (38%)</td>
</tr>
<tr>
<td>Non-Hispanic White</td>
<td>15 (36%)</td>
<td>13 (38%)</td>
<td>2 (25%)</td>
</tr>
<tr>
<td>Non-Hispanic Black</td>
<td>3 (7%)</td>
<td>3 (9%)</td>
<td>0 (0%)</td>
</tr>
<tr>
<td>Non-Hispanic Other</td>
<td>8 (19%)</td>
<td>5 (15%)</td>
<td>3 (38%)</td>
</tr>
</tbody>
</table>
Results: Symptoms

- Significant difference in symptoms between low and high group at BOM ($p < .01$) but also at EOM ($p < .01$)
- Individual symptom levels did not change significantly from BOM to EOM for low group
- Individual symptom levels did not change significantly from BOM to EOM for high group
- Time (1.9 years) did not improve symptom distress
Results: PA & QOL

PA

• Low symptom group was more active than high symptom group but not significant
• Low symptom group trended towards an increase in PA during maintenance; high symptom group remained the same

QOL

• Low symptom group had significantly better QOL than high symptom group at BOM & EOM
• QOL trended towards improvement in both symptom groups during maintenance but not significant
Results: Symptoms, PA, QOL

- When grouped by PA, children with active PA (n = 24) at BOM had significantly better sleep at EOM ($p = .03$).
- When grouped by PA and symptoms at BOM:
  - Low symptom, normally active children (n = 21) had significantly better QOL at EOM ($p < .01$), than the high symptom, normally active group (n = 3) and the high symptom, inactive group (n = 4).
Discussion

• Health care providers may assume symptoms will resolve on their own when therapy is less intensive.
• For children with high symptoms, this does not appear to be the case.
• High symptom group had persistent fatigue and poor quality sleep at the EOM
• PA positively influences sleep
• When active PA and low symptoms analyzed together → better QOL
References


Questions?

• May contact at hook0035@umn.edu