Linking Pediatric and Adult Spinal Cord Injury Outcomes Instruments
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Objective
To link scores from two recently developed contemporary functional outcome measures, the adult Spinal Cord Injury Functional Index (SCI-FI) and the Shriners Hospitals for Children Pediatric Scales (SHC SCI Scales)

Design and Methods

- Secondary data analysis of 50 common items on the adult SCI-FI and SHC SCI Scales
  - SHC SCI Scales were administered to 381 children with SCI and 322 of parents with children with SCI
  - SCI-FI was administered to 855 adults with SCI
- Nonequivalent group design

Instruments

SHC SCI Scales1,2
- 303 items, four domains: general mobility (n=20), wheeled mobility (n=64), daily routines (n=194), ambulation (n=95)
- 164 supplemental items (specific to age, sex, level of injury, adaptive equipment, school environment)
- Computer Adaptive Tests
- Parent and Child report

SCI-FI3,4
- 275 items, five domains: basic mobility (n=54), wheelchair (n=56), self-care (n=90), fine motor (n=36), ambulation (n=39)
- 145 core items (relevant to all adults)
- 130 supplemental items (specific to sex, level of injury, adaptive equipment)
- Computer Adaptive Tests
- Patient report

SHC SCI Scales and SCI-FI

Common response scale:
- unable (can’t do), with much difficulty (really hard*), with some difficulty (kind of hard*), with a little difficulty (a little hard*), without difficulty (easy*)

*verbiage used for child response scale

Analytical Strategies

- Differential Item Functioning (DIF) of common items (examined if item functioned differently in pediatric and adult samples and; based on ability level and; interaction of both)
- DIF-free items served as common link between all items of the pediatric and adult scales
- Correlation of item difficulty parameters between pediatric and adult scales calculated
- Test characteristic curve approach, using Stocking-Lord Strategy, transformed pediatric scores into adult scores

Results

Table 1: Correlation Coefficients for Pediatric and Adult Scales

<table>
<thead>
<tr>
<th>SHC SCI Scales</th>
<th>SCI-FI</th>
<th>Correlation coefficients</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wheeled Mobility</td>
<td>0.95</td>
<td></td>
</tr>
<tr>
<td>Daily Routine/Self-care</td>
<td>0.97</td>
<td></td>
</tr>
<tr>
<td>Daily Routine/Fine Motor</td>
<td>0.98</td>
<td></td>
</tr>
<tr>
<td>Ambulation</td>
<td>0.90</td>
<td></td>
</tr>
<tr>
<td>General Mobility</td>
<td>0.86</td>
<td></td>
</tr>
<tr>
<td>Wheeled Mobility</td>
<td>0.94</td>
<td></td>
</tr>
<tr>
<td>Daily Routine/Self-care</td>
<td>0.96</td>
<td></td>
</tr>
<tr>
<td>Daily Routine/Fine Motor</td>
<td>0.90</td>
<td></td>
</tr>
<tr>
<td>Ambulation</td>
<td>0.90</td>
<td></td>
</tr>
<tr>
<td>General Mobility</td>
<td>0.73</td>
<td></td>
</tr>
</tbody>
</table>

Figures:
1. A scaled score of 36.4 on both the parent and child reported SHC SCI Wheeled Mobility Scale is comparable to a scaled score of 49.2 and 39.4, respectively on the SCI-FI Wheelchair Scale.
2. A scaled score of 32.1 on both the parent- and child-reported SHC SCI Daily Routines Scale is comparable to a scaled score of 36.3 and 40.2 respectively on the Adult SCI-FI Daily Routine/Self-care scale.
3. A scaled score of 32.1 on both the parent- and child-reported Paul SCI/SHC SCI Daily Routines Scale/Fine Motor scale is comparable to a scaled score of 37.1 and 41 respectively on the Adult SCI-FI Daily Routine/Fine Motor scale.
4. A scaled score of 29.2 on both the parent- and child-reported SCI Ambulatory scale is comparable to a scaled score of 50.7 and 49.8 respectively on the Adult SCI-FI Ambulatory scale.
5. A scaled score of 42.6 on both the parent- and child-reported SCI General Mobility Scale is comparable to a scaled score of 50.1 and 53.1 respectively on the Adult SCI-FI General Mobility scale.

Discussion

- Estimates to link child and parent reported scores on a pediatric functional outcomes instrument to scores on an adult functional outcomes instrument were successfully created
- The linking estimates provide, for the first time ever, a mechanism to track and compare the functional ability of persons with SCI across the lifespan, regardless of age at injury or age at test administration.
- The accuracy of the estimates require validation and is the focus of a currently funded study.

References

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