Safe Client Mobilization:
Musculoskeletal strain and preventive interventions in home care

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Objective

Describe musculoskeletal strain & preventive interventions among home care aides
Overview of Mixed Methods

1. Pre-survey phase (qualitative field study)
   - Focus groups (n=12) with HC aides
   - In-depth interviews (n=26) with HC managers, clients, organizers, other

2. Cross-sectional survey (quantitative field study)
   - HC aides (n=1249)
   - Most recent HC visits (n=3484)

3. Post-survey phase (qualitative field study)
   - Focus groups (n=9) with HC aides
   - In-depth interviews (n=7) with HC managers

4. Transfer board evaluation & usability lab study
   (quantitative & qualitative laboratory study)
   - HC aides (n=16) lab visits
What is the nature of HC work, OSH hazards, and interventions?

Method 1: Pre-survey Phase (qualitative)

Focus Groups

12 focus groups: 99 HC aides
- Employed by agencies (n=10)
- Employed by clients (n=2)

In-depth Interviews

26 one-on-one interviews
- Employers’ & workers’ representatives, insurance company represent. (n=15)
- HC clients (n=11)

Data Collection

- Scripts: open-ended questions
- Audio-recording
  — Transcribed verbatim

Data Analysis

- Computer-assisted thematic analysis
  — NVIVO software
Results 1: Pre-survey Phase (qualitative) Musculoskeletal Disorders (MSDs) & Hazards in HC

- Back pain/ injuries
- Shoulder injuries
- Manual client handling/transfer tasks
- Homemaking tasks
- Interventions to prevent MSDs
  - In-service trainings
  - Ergonomic assistive devices
Results 1: Pre-survey Phase (qualitative)

“I have a private client I take care of who's ALS . . . quadriplegic. . . I kept saying, I need a shower chair. I can't do this. Well, the day came, I almost dropped him three times in that shower. And that's when he said, oh, maybe I need a shower chair. And he got one. And so now showers with him, I take him, I put him in the shower chair, and give him a shower. And that's it. So it's much easier.”

-- Safe Home Care Project Focus Group, HC aide

What is the magnitude of occupational injuries, hazards, and exposures in HC?

Method 2: Cross-sectional Survey

Study population of HC aides: n=1249
- Agency-employed aides (n=634)
- Client-hired aides (n=615)

HC visits collected: n=3484

Results 2: Survey

Back pain in the past 12 months

Aides with back pain (n=420):

- Back pain considered work-related 76% (n=320)
- Required medication 68% (n=285)
- At least once/week 59% (n=249)
## Results 2: Survey
### Client transfer device use
#### All aides (N = 1249)

<table>
<thead>
<tr>
<th>Client transfer devices used in the past 12 months</th>
<th>Aides (n)</th>
<th>%</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Did not use any device</td>
<td>663</td>
<td>53</td>
<td>(50.3, 55.9)</td>
</tr>
<tr>
<td>Used at least one assistive device**</td>
<td>442</td>
<td>35</td>
<td>(32.7, 38.1)</td>
</tr>
<tr>
<td>Transfer board, draw sheet</td>
<td>253</td>
<td>20</td>
<td>(18.5, 22.6)</td>
</tr>
<tr>
<td>Gait belt</td>
<td>269</td>
<td>22</td>
<td>(19.3, 23.9)</td>
</tr>
<tr>
<td>Mechanical lift</td>
<td>236</td>
<td>19</td>
<td>(16.8, 21.2)</td>
</tr>
</tbody>
</table>

** Included at least one of these: transfer board, draw sheet, gait belt, mechanical lift, shower chair, stair lift, electric bed, porch lift, other
What are your interpretations of the survey findings? Why, what, and how?

Method 3: Post-survey Phase (qualitative)

- Focus groups: HC aides
  - Nine (9) focus groups: 70 HC aides who completed the survey

- In-depth interviews: Employers’ and workers’ representatives
  - Seven (7) one-on-one interviews: HC agency managers, HC trade association & union organizers
Results 3: Post-survey Phase (qualitative)

Interpreting key survey findings (9 focus groups), interviews (n=7)

- Use of assistive equipment depends on the client

- Many transfer devices are not usable in HC

- Employers do not know what transfer devices are both safe and practical in the home
Do board-assisted client transfers reduce physical workload? How usable are transfer boards in HC?

Method 4: Transfer Board Lab Study (quantitative) & Usability Assessment (qualitative)

Method 4: Transfer Board Lab Study

- Simulated HC environment in biomechanics lab
  - Non-adjustable bed and wheelchair

- Sixteen (16) HC aides performed two client transfer tasks
  - Wheelchair to bed (lower → higher)
  - Bed to wheelchair (higher → lower)
  - One “manual” transfer and four board transfers

- Evaluate physical workload & usability

- Manual transfer with belt
- Wood board with & without low friction material
- Roll-easy board
- Beasy board
Method 4: Lab study

Electrodes ➔ to measure the muscle activities

Lumbar motion monitor ➔ to measure the posture

Bed surface: 1 ft 9.5 in
Wheelchair: 1 ft 6 in
Ground level: 0

Bed surface about 55 cm
Wheelchair seat about 45 cm
Method 4: Usability study

Transfer board usability evaluation questionnaire

Transfer Board Evaluation Survey (Beasy board)

Please circle or mark the ONE number that best describes your degree of satisfaction with each of the 19 items. Do not leave any question unanswered.

<table>
<thead>
<tr>
<th>Rating</th>
<th>Strongly disagree</th>
<th>Strongly agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>I have used this board or a similar type of board before.</td>
<td>Yes, No</td>
<td></td>
</tr>
<tr>
<td>1. Generally, the board is easy to use.</td>
<td>1 2 3 4 5 N/A</td>
<td></td>
</tr>
<tr>
<td>2. This board is very helpful during client transfer.</td>
<td>1 2 3 4 5 N/A</td>
<td></td>
</tr>
<tr>
<td>3. I can easily place the board underneath the client.</td>
<td>1 2 3 4 5 N/A</td>
<td></td>
</tr>
<tr>
<td>4. I could use this board to complete an entire transfer task by myself.</td>
<td>1 2 3 4 5 N/A</td>
<td></td>
</tr>
<tr>
<td>5. It takes a lot of effort to transfer the client using the board.</td>
<td>1 2 3 4 5 N/A</td>
<td></td>
</tr>
<tr>
<td>6. It takes a lot of time to prepare and use this board to perform the transfer task compared with a manual transfer.</td>
<td>1 2 3 4 5 N/A</td>
<td></td>
</tr>
<tr>
<td>7. I feel that using this board is safe for me.</td>
<td>1 2 3 4 5 N/A</td>
<td></td>
</tr>
<tr>
<td>8. I worry that the client may fall off during transfer.</td>
<td>1 2 3 4 5 N/A</td>
<td></td>
</tr>
<tr>
<td>9. I worry about the cleanliness of the board when using it for multiple clients</td>
<td>1 2 3 4 5 N/A</td>
<td></td>
</tr>
<tr>
<td>10. It was difficult to learn how to use the board.</td>
<td>1 2 3 4 5 N/A</td>
<td></td>
</tr>
<tr>
<td>11. I think this board would be easier to use with more practice.</td>
<td>1 2 3 4 5 N/A</td>
<td></td>
</tr>
<tr>
<td>12. I like the appearance of this board</td>
<td>1 2 3 4 5 N/A</td>
<td></td>
</tr>
<tr>
<td>13. I feel comfortable using the transfer board</td>
<td>1 2 3 4 5 N/A</td>
<td></td>
</tr>
<tr>
<td>14. I feel that the board is high quality and will last long.</td>
<td>1 2 3 4 5 N/A</td>
<td></td>
</tr>
<tr>
<td>15. The shape or size of the board is appropriate for this job.</td>
<td>1 2 3 4 5 N/A</td>
<td></td>
</tr>
<tr>
<td>16. I think this board will be convenient to store in a client’s home.</td>
<td>1 2 3 4 5 N/A</td>
<td></td>
</tr>
<tr>
<td>17. The board would be easy to carry on public transportation</td>
<td>1 2 3 4 5 N/A</td>
<td></td>
</tr>
<tr>
<td>18. I would like to use this transfer board during future client care.</td>
<td>1 2 3 4 5 N/A</td>
<td></td>
</tr>
<tr>
<td>19. How would you evaluate the overall experience with this transfer method (1 = the worst, 10 = the best)?</td>
<td>1 2 3 4 5 6 7 8 9 10</td>
<td></td>
</tr>
</tbody>
</table>

[Please ONLY fill out this form after all trials of experiment (a total of 5 transfer methods) are finished.]

1. If you could choose only one client transfer method, which would you prefer?
   - 1. Wood board
   - 2. Beasy board
   - 3. Wood+Tyvek
   - 4. Roll Easy board
   - 5. Manual transfer

2. If you were to tell another health care aide about this transfer method, what would you describe as its top 3 benefits? (For example, the ease of use, my safety, client’s safety)
   Please describe:
   a. 
   b. 
   c. 

3. What would you tell that person you didn’t like about it?
   Please describe:
   a. 
   b. 
   c. 

4. Do you have suggestions about ways to improve this method?
   Please describe:

   (Use back of page for additional comments)
Results 4: Lab Study – Hand Force

Hand force from wheelchair to bed transfer

Left hand force during wheelchair (lower) to bed (higher) transfer (right hand lead) (N = 15)

<table>
<thead>
<tr>
<th></th>
<th>A</th>
<th>B</th>
<th>B</th>
<th>B</th>
<th>B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manual</td>
<td>94.8</td>
<td>49.2</td>
<td>45.2</td>
<td>37.1</td>
<td>45.6</td>
</tr>
</tbody>
</table>

Right hand force during wheelchair (lower) to bed (higher) transfer (right hand lead) (N = 14)

<table>
<thead>
<tr>
<th></th>
<th>A</th>
<th>AB</th>
<th>ABC</th>
<th>BC</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manual</td>
<td>131.3</td>
<td>124.6</td>
<td>123.8</td>
<td>117.8</td>
<td>111.7</td>
</tr>
</tbody>
</table>

Hand force from bed to wheelchair transfer

Left hand force during bed (higher) to wheelchair (lower) transfer (left hand lead) (N = 15)

<table>
<thead>
<tr>
<th></th>
<th>A</th>
<th>B</th>
<th>B</th>
<th>B</th>
<th>B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manual</td>
<td>114.5</td>
<td>85.8</td>
<td>80.8</td>
<td>74.6</td>
<td>80.8</td>
</tr>
</tbody>
</table>

Right hand force during bed (higher) to wheelchair (lower) transfer (left hand lead) (N = 14)

<table>
<thead>
<tr>
<th></th>
<th>A</th>
<th>B</th>
<th>B</th>
<th>B</th>
<th>B</th>
<th>B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manual</td>
<td>75.4</td>
<td>32.6</td>
<td>28.3</td>
<td>25.4</td>
<td>36.6</td>
<td></td>
</tr>
</tbody>
</table>
Results 4: Lab Study – Usability Assessment

1. The board with the sliding mechanism most preferred

2. Training & practice necessary to master the right technique

3. Combination of interventions valuable
Conclusions

Broader understanding of musculoskeletal strain & interventions through mixed methods

• Nature & language of HC work (qual.)
• Occupational exposures & health hazards (qual.)
  – As experienced by HC aides
  – Management perspective
• Prevalence of musculoskeletal strain & determinants (quant.)
• Opportunities for interventions (qual.)
• Assessment of interventions (quant.)


