Rehabilitation in long-term care: Interventions and their effect on activities of daily living and falls quality indicators

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This webinar will explore recent research surrounding physical rehabilitation (PR) in LTC by:

1) Describing what is known about:
   - a) tools to determine who should receive PR services
   - b) which PR services have been evaluated
   - c) how they have been evaluated at the resident-, facility-, and system-level

2) Describing the relationship between PR and facility-level activity of daily living and falls quality indicators

3) Describing the impact of the 2013 funding change in Ontario LTC homes in 2013 on activities of daily living and falls quality indicators
Background: the aging population and long-term care

- 7.1% of the Canadian population over the age of 65 resides in long-term care (LTC) homes
  - this number is projected to double within the next 20 years\(^1\)

- 95% of residents require at least some assistance with activities of daily living (ADLs)
  - more than 80% required extensive care\(^2\)
Background: physical rehabilitation

- Physical rehabilitation (PR) can prevent further decline

- Often limited by significant financial and political constraints

- Leadership is required to plan, deliver and evaluate services in LTC
Background: what is known and unknown about physical rehabilitation in LTC

- Few residents receive services, receipt of services not always related to need, significant room for improvement.

- Lack of evidence surrounding PR interventions, considerable heterogeneity in the models of delivery, staff providing, time allocated to and goals of PR interventions.

- An overabundance of constructs has been used to evaluate PR at the resident-level (e.g., ADLs, falls, mood).

- How can we identify which residents would benefit from rehabilitation?

- Broad understanding of what PR interventions have been evaluated in the literature:
  - both active and passive modalities
  - full spectrum of professionals who could be involved in delivering services

- Which specific facility- or system-level measures (quality indicators – QIs) could be used to evaluate PR in LTC?
Background: policy change 2013
Background: policy change 2013

Before:
- Fee for service billed directly to OHIP
- At the discretion of the physical therapist, with referral from physician

After:
- Budget base program
  - LTC home receive block funds per bed per year
  - Strict eligibility criteria
  - Discharge once therapeutic goals met
  - Additional per diem for exercise classes
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A scoping review of physical rehabilitation interventions, outcomes and tools for eligibility in LTC

**Research Question 1:**
What are the characteristics of PR interventions that have been evaluated in LTC?

**Research Question 2:**
Which outcomes have been used to evaluate them?

**Research Question 2B:**
Which QIs have been used to evaluate PR in LTC?

**Research Question 3:**
Which tools exist for decision-making around who is eligible for PR services?

Methods

Structured scoping review using Arksey and O’Malley framework

Key concepts: LTC, PR, interventions that have been evaluated, elderly, decisions regarding resource allocation, tools to assist in decision making, and evaluation including quality indicators

A) Licensed databases:
- MEDLINE Pubmed
- EMBASE
- CINAHL
- Cochrane Database of Systematic Reviews
- Physiotherapy Evidence Database (PEDro)
- Occupational Therapy Systematic Evaluation of Evidence database (OTseeker)

B) Grey Literature:
- Canadian Institute for Health Information
- Ministry of Health and LTC
- National institute of Health
- Government and Legislative Libraries Online Publications Portal
- Canadian Physiotherapy Association
- Ontario Long-term Care Association
- American Academy of Physical Medicine and Rehabilitation
- University of Waterloo’s library catalogue
- broad Google search
Methods

Inclusion criteria:

- case studies, prospective, longitudinal, retrospective case-control, randomized controlled trials, quasi-randomized clinical trials or controlled clinical trials, clinical practice guidelines, systematic reviews, and relevant reports generated by policy makers.

- >1/2 participants will have to be \( \geq 65 \) years of age, residing in a LTC facility

- focus on PR as defined by the Canadian Physiotherapy Association.

- focus on either a PR intervention, a tool, model or framework for system level decision making regarding eligibility for PR services, or describe, evaluate or provide evidence for a quality indicator used to evaluate PR

Exclusion criteria:

- tools or models that have not been validated will be excluded (proof of face, construct, or criterion validity must be demonstrated)

- non-English full text papers, clinical commentaries, abstracts or unpublished literature

Results

- 13211 records identified through database searching
- 16 reports identified through grey literature search
- 6721 records after duplicates removed
- December 2016 update: 885 records identified through database searching
- 7606 records screened
- 818 full-text articles assessed for eligibility
- 381 articles and 2 reports included in scoping review

- 437 Full-text articles excluded:
  - long-term care: 174 were not completed in a long-term care facility
  - population: 8 mean age not ≥65 years old
  - physical rehabilitation: 60 did not pertain to physical rehabilitation as defined by the Canadian Physiotherapy Association.
  - Study design: 182 were not an included study design, 7 were protocols of articles already included 26
  - English: 6 were not written in English

Research question 1:
380 reported interventions of PR in LTC

Research question 2:
A) 380 articles reporting outcomes of PR interventions in LTC
B) 3 articles, 2 reports describe quality indicators to evaluate PR in LTC (results reported elsewhere)

Research question 3:
0 tools or models for determining eligibility
<table>
<thead>
<tr>
<th>Evidence from scoping review</th>
<th>Key points for researchers</th>
</tr>
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<tbody>
<tr>
<td>• 23.4% of studies included only ambulatory residents, with very few specifically including non-ambulatory or bedridden, 16.3% included residents with evidence of dementia, 27.3% excluded medically acute</td>
<td>• Include residents who are reflective of those currently in LTC (e.g., with cognitive impairment, medically complex)</td>
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<tr>
<td>• Frequently delivered by research staff, or physical therapist 3–5 days per week, 25–50 minutes, 10–18 weeks</td>
<td>• Explore realistic and sustainable interventions (e.g., multidisciplinary integrated models of care)</td>
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<tr>
<td>• Length of stay often not distinguished inclusion/exclusion criteria</td>
<td>• Examine short-stay models of care (e.g., convalescent care)</td>
</tr>
<tr>
<td>• 27.3% excluded medically acute, mood and quality of life less frequently used as outcome measures</td>
<td>• Explore and evaluate palliative models of care including rehabilitation (e.g., relief from pain and other symptoms, active life until death)</td>
</tr>
<tr>
<td>• Majority of outcomes reported at the resident level</td>
<td>• Analyze effects of rehabilitation interventions at facility- and system-levels (e.g., use quality indicators, healthcare transitions)</td>
</tr>
<tr>
<td>• No validated tools for determining service eligibility were found</td>
<td>• Develop tools for determining who could receive services</td>
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</table>

**Key points FOR CLINICIANS**

- 10 most frequently used outcome measures to evaluate physical rehabilitation in long-term care:

**Evidence from scoping review**

**Performance-based measures:**
1. Dynamometer  
2. Timed Up and Go

**Activities of daily living:**
1. Barthel Index  
2. Functional Independence Measure

**Mood:**
1. Geriatric Depression Scale  
2. Philadelphia Geriatric Centre Morale Scale

**Falls:**
1. Chart review/incident report  
2. Falls Efficacy Scale

**Quality of life:**
1. Short-Form 12  
2. Life Satisfaction Index

Quality indicators (QIs):

- facility-level measures that are used internationally to capture the structure, process and outcomes within and between LTC homes.
- Often publicly reported to encourage consumers to make informed decisions around the quality of service providers and to stimulate internal quality improvement strategies within LTC homes.

- Can be used to:
  - guide clinical decision making
  - evaluate and report treatment effectiveness
  - benchmark achievements
  - guide and evaluate quality improvement initiatives and strategic planning
  - implement guideline recommendations
  - inform policy
  - set national benchmarks
  - determine resource allocation
Scoping review – part 2

**Research Question 2B:** Which QIs have been used to evaluate PR in LTC?

Consult stakeholders to identify which existing QIs could be used to evaluate PR in LTC

Use the available evidence and stakeholder consultation to identify which existing or new QIs could be used to evaluate PR in LTC
Methods

1. As per scoping review in Study 1
2. Consensus process:
   - Modified nominal group technique\textsuperscript{10, 11}
   - 14 Stakeholders from PR and LTC were asked:
     “What do you think should be the quality indicators used to evaluate physical rehabilitation in long-term care?”
     - Online vote for QIs prior to meeting
     - Presentation of results of online vote
     - Discussions re: results of online vote – Agree? Disagree? Omissions? Why?
     - Re-ranking of QIs
     - Discussions
Results

13211 records identified through database searching  
16 reports identified through grey literature search

6721 records after duplicates removed

December 2016 update:  
885 records identified through database searching

7606 records screened  
6788 records excluded

818 full-text articles assessed for eligibility

381 articles and 2 reports included in scoping review

437 full-text articles excluded:
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Results – literature review

QIs reported:

- Decline in late loss ADLs (bed mobility and eating) - 2
- Little or no activity, prevalence of bedridden residents - 2
- Bowel/bladder incontinence – 2
- Improvement in mid-loss ADLs (walk/wheel and transfer) - 1
- If a functional assessment had been completed - 1

QIs appeared to be related to rehab:

- Decreased range of motion
- Lower prevalence of bedridden residents and residents with little or no activity
- Unplanned feed tube placement

Evidence to support use:

- Limited – 3 reported source of data derivation, 1 reported involvement of consensus process, 1 reported prevalence and variation, none reported sensitivity or timeframe for change
Results – consensus votes

Pre-meeting vote

Number of votes

Quality indicator domain

Post-meeting ranking

Weighted ranking score

Quality indicator domain
Results – key points

- ADL and falls QIs should be used
- Other QIs: pain, quality of life, mood, restraints, incontinence, pressure ulcers
- QIs should be examined in relation to each other
- A set of QIs that can be used across settings for frail, older adults should be developed
- Risk adjustment and confounders must be explored
- Both an improvement in and maintenance of ADLs should be examined
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<th><strong>Methods</strong></th>
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<td>1. To describe the distribution of ADL and falls QIs across LTC homes in Canada</td>
<td>• Box plots of ADL and falls QIs across provinces</td>
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</table>
| 2. To determine the relationship between PR and facility-level ADLs and falls QIs within LTC homes across four Canadian provinces and one territory | • Cumulative proportional odds models, stratified by province  
 • covariates significant at p < 0.2 were added to the multivariable regression  
 • Variables were retained within the final multivariable model at p < 0.01 |
| 3. To determine other facility level factors (e.g., size, rurality) are related to QI performance | |

**Data collection:**
- RAI 2.0 for all LTC homes in Ontario, Manitoba, British Columbia, and Alberta
- Explanatory variables – October to December, 2014
- Response variables – January to March, 2015
Methods

- **Control Variables:**
  - Size of facility
  - Urban/rural
  - Health region
  - Neighbourhood quintile

- **Explanatory Variables – proportion of residents with:**
  - receiving rehabilitation (PT/OT/SLP, nursing rehab, therapeutic rec)
  - Rehab potential – self-, staff-, CAP-identified
  - Diagnoses – dementia, Parkinson’s, stroke, multiple sclerosis, hip fracture
  - Other – acute care, physician visits, antipsychotic use
The 8 QIs used as response variables

Activities of daily living

Early-loss

Mid-loss

Late-loss

Falls

% residents who have fallen in past 30 days

Risk adjusted through: restriction, indirect standardization, and stratification with direct standardization\textsuperscript{12, 13}

Expressed as percentile ranking:

- < 20th: “excellent”
- 20-80th: “average”
- >80th: “poor”
Results

- 914 homes

- Most were:
  - large (59.7%)
  - in Ontario (63.2%)
  - in urban centres (81.5%)
Results – QIs across provinces

Improved Early Loss

Improved Mid Loss

Improved Late Loss

Better performance
Results – QIs across provinces

Worse Early Loss

Worse Mid Loss

Worse Late Loss

Better performance
Results – QIs across provinces

Better performance

Worse overall ADLs
Results – QIs across provinces

Better performance
Results – final multivariable models

Rehabilitation

- PT/OT/SLP
  - falls QI in BC

- Nursing rehab
  - Consistent relationship with prevention of ADL decline in Alberta
    - Worse late-, mid-, early-loss and overall ADL performance

- Rehab potential
  - CAP triggered with improved late-loss QI in Alberta

Other facility-level factors

- Hip fracture
  - Improved late-loss ADLs in BC
  - Improved mid-loss ADLs in BC and Ontario
  - Improved early-loss ADLs in BC
  - Worse early-loss ADLs in Alberta
  - Worse overall ADL long-form score in BC

- Multiple sclerosis
  - Worse late-loss ADLs in BC and Alberta
  - Worse early-loss ADLs in Alberta
  - Improved early-loss ADLs in BC
  - Falls in BC

Negative relationship
Positive relationship
Conclusions

- QI scores varied widely across provinces

- no consistent relationship between rehabilitation and QI performance
  - Except receiving nursing rehab services in Alberta

- The proportion of residents with multiple sclerosis or hip fracture often associated with QI performance
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<td>1. To describe and examine trends in the ADL and falls QIs before and after the policy change, and in the proportion of residents receiving PR services.</td>
<td>• Box plots of ADL and falls QIs, percentage of residents receiving PT over time</td>
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</table>
| 2. To evaluate the effect of the policy change on facility-level ADL and falls QIs | • Linear mixed regression model  
• Toeplitz covariance structure |

Same control variables as study 3

Response variables (QIs): expressed as continuous value

Rehabilitation variable: amount of PT only

January 1st, 2011 to March 31st, 2015
Results – PT over time

Proportion of residents receiving 4 levels of physical therapy (PT) from 2010 to 2015

- 84.6%
- 56.6%

Years by quarter

Legend:
- Blue: Receiving no PT
- Pink: Receiving PT for < 45 minutes per week
- Green: Receiving PT for 45 to 150 minutes per week
- Brown: Receiving PT for > 150 minutes per week

Policy change
Results – PT over time

Proportion of residents receiving 4 levels of physical therapy (PT) from 2010 to 2015

Policy change

Proportion of residents receiving PT

Years by quarter

Receiving no PT
Receiving PT for < 45 minutes per week
Receiving PT for 45 to 150 minutes per week
Receiving PT for > 150 minutes per week

0.5%
65.8%
18.2%
0.2%
32.9%
22.2%
Results – PT over time

Residents receiving PT:

2010
Mean: 49.1 minutes, 2.9 days
Median: 45.0 minutes, 3.0 days

2015
Mean: 44.2 minutes, 2.5 days
Median: 45.0 minutes, 3.0 days

Fewer residents are receiving PT
Those that receive it, receive on average the same amount
Results – other rehab over time
Results – QIs with worse performance over time
Results – QIs with better performance over time

Worse Early Loss

Worse Late Loss
Results – QIs with unchanged performance over time

- Worse overall ADLs
- Falls
## Results

<table>
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<tr>
<th>PT and interaction with policy change</th>
<th>Quality indicators – proportion of residents with:</th>
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<tbody>
<tr>
<td></td>
<td>worse late loss ADLs</td>
</tr>
<tr>
<td>No PT</td>
<td>✓</td>
</tr>
<tr>
<td>PT for &lt; 45 minutes on &lt; 3 days</td>
<td>✓</td>
</tr>
<tr>
<td>PT for 45-150 minutes on 3-5 days</td>
<td>✓</td>
</tr>
<tr>
<td>PT for &gt; 150 minutes on &gt; 5 days</td>
<td></td>
</tr>
</tbody>
</table>

✓ denotes association with improved performance on the quality indicator; × denotes association with worse performance on the quality indicator; all associations are with \( P<0.01 \)

Note: models are adjusted for health region, facility size, income quintile, and rurality, and their interaction terms with the intervention
Conclusions

- Over time in Ontario, QIs measuring ADL improvement are getting worse, but prevention of ADL decline are getting better.

- After the 2013 policy change fewer residents received PT overall.

- The policy change appears to be associated with improved performance on several ADL QIs.
  - Except least time intense PT was associated with poorer performance on two of the ADL QIs.
Overall conclusions

- intervention trials often include unrealistic residents
- few studies have examined QIs in relation to rehab
- QIs vary widely across provinces
- no consistent relationship with rehab
  - except for certain areas
- After 2013 policy change:
  - Fewer residents receiving PT overall
  - associated with improved performance on several ADL QIs, but worse on two QIs
Limitations

- Resident voice
- Breadth rather than depth
- Ecological fallacy
- Only capture PT provided in the last 7 days
- Indirect care not gathered
Future directions

- Develop definition of quality rehabilitation in LTC
- Explore resident goals for rehab
- Future interventions should:
  - Include residents who are complex
  - Be realistic and sustainable
  - Sufficiently intense
  - Targeted appropriately
  - Embed elements of rehabilitation into daily practice
- Examine provinces/homes with superior QI performance
- Develop tools to determine service eligibility to appropriately target rehab
- Ensure rehab data is entered accurately into RAI 2.0
LTC Series - Keeping #LTC residents strong can be part of a good #falls prevention program. ow.ly/M4rs30csqdf
@OsteoporosisCA

https://www.youtube.com/user/OsteoporosisLTC/playlists
Acknowledgements

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References


Thank you!

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