The Impact of Home Health Care on Cost Effectiveness Compared to Other Post-Acute Settings in Individuals Status Post Total Joint Arthroplasty: A Systematic Review

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Purpose

To determine the cost effectiveness of home health care (HHC) compared to other post-acute care (PAC) settings in individuals status post total joint arthroplasty (TJA)
Hip and knee replacements are the most common procedure for Medicare patients.

In 2014, over 400,000 total hip and total knee replacements were performed.

Resulted in over 7 billion dollars in hospitalization alone.

By 2030, projected increase to 3.48 million TKAs and 572,000 THAs.

Post-surgery physical therapy settings presently vary between outpatient, inpatient, and rehab.
Implications

- With the expected increase of patients undergoing TJA procedures, a need to determine the most cost effective PAC route is needed.
- It is currently unclear which post-acute settings deliver the greatest value to an episode of care.
Methods

- Databases:
  - PubMed
  - Medline
  - Health Source: Nursing/Academic Edition
  - CINAHL

- Two reviewers independently assessed each study
  - MINORS scale
<table>
<thead>
<tr>
<th>Article Authors</th>
<th>MINORS Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mahomed N et al&lt;sup&gt;3&lt;/sup&gt;</td>
<td>21/24</td>
</tr>
<tr>
<td>Sigurdsson E et al&lt;sup&gt;4&lt;/sup&gt;</td>
<td>20/24</td>
</tr>
<tr>
<td>Ramos NL et al&lt;sup&gt;5&lt;/sup&gt;</td>
<td>14/24</td>
</tr>
<tr>
<td>Sabeh KG et al&lt;sup&gt;6&lt;/sup&gt;</td>
<td>13/24</td>
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<tr>
<td>Ponnusamy KE et al&lt;sup&gt;7&lt;/sup&gt;</td>
<td>13/24</td>
</tr>
<tr>
<td>Bozic KJ et al&lt;sup&gt;8&lt;/sup&gt;</td>
<td>11/24</td>
</tr>
<tr>
<td>Slover JD et al&lt;sup&gt;9&lt;/sup&gt;</td>
<td>10/24</td>
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</table>

Mean: 14.6/24  
Range: 10/24 – 21/24
Methods

► Search Terms

► ("Total Joint Replacement" OR "Total Joint Arthroplasty" OR "Total Hip Replacement" OR "Total Hip Arthroplasty" OR "Total Knee Replacement" OR "Total Knee Arthroplasty") AND (Home-health* OR home health* OR home care OR home-based rehab* OR home intervention*) AND (Cost* Effect* OR Cost* OR cost-benefit* OR cost value analysis)

► Search Limits

► English, published 2008-2018, human subjects, and peer reviewed scholarly journals
Eligibility Criteria

- Adults ≥45 years of age
- Underwent a TJA
- HHC vs. other PAC settings
- Must examine at least one cost-effectiveness outcome measure
Records identified through database searching (n=178)

Additional records identified through other sources (n=1)

Records after duplicates removed (n=128)

Records screened (n=128)

Full-text articles assessed for eligibility (n=24)

Studies included in qualitative synthesis (n=7)

Records excluded (n=103)

Articles excluded (n=17)

Subjects ≤45 (1)
Non-systematic review of the literature (3)
Did not receive HHC (3)
Does not measure cost effectiveness between HHC and other PAC (10)
Results

- Sample size
  - Range: 50-468,075
  - Total: 729,983

- Primary Outcomes
  - Cost of Post-Acute Care Routes

- Secondary Outcomes
  - Length of Stay
  - Physical Function & Quality of Life
  - Readmission Rates
  - Comorbidities
<table>
<thead>
<tr>
<th>Article</th>
<th>Home Health</th>
<th>Skilled Nursing</th>
<th>Inpatient Rehab</th>
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<tbody>
<tr>
<td>Mahomed N et al³</td>
<td>$11,082</td>
<td>N/A</td>
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<tr>
<td>Sigurdsson E et al⁴</td>
<td>$8,550</td>
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<td>Ramos NL et al⁵</td>
<td>$4,000</td>
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<td>Sabeh KG et al⁶</td>
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<td>Ponnusamy et al⁷</td>
<td>$5,785</td>
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<td>Bozic KJ et al⁸</td>
<td>$5,054</td>
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<td>Slover JD et al⁹</td>
<td>$4657</td>
<td>$11,719</td>
<td>N/A*</td>
</tr>
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</table>
Results

- Economic Evaluation
  - All seven studies found that HHC costs were lower than any other PAC route that was examined\textsuperscript{3-9}

- Readmission Rate
  - Two studies found HHC was comparable to SNF but was significantly lower than IRF\textsuperscript{5,7}

- Patient Comorbidities
  - Three studies found those discharged to IRF had significantly higher comorbid conditions compared to HHC or SNF\textsuperscript{3,5,7}
Results

- **Length of Stay**
  - Inconsistent across studies\(^3,5,7,9\)

- **Functional Outcomes**
  - One study found it to be more cost effective when analyzing the OHS\(^4\)
  - All other functional outcomes (WOMAC, SF-36, patient satisfaction) were comparable no matter what the discharge setting\(^3\)
Conclusion

- Findings consistently showed that a discharge to home health costs significantly less than an IRF or SNF
- Moderate evidence suggesting that discharge to HHC is shown to be more cost effective than discharge to a SNF or IRF
Limitations

- Inconsistent sample characteristics
- Unclear protocols
- Lack of long-term follow up
- Inadequate reporting of comorbidities
- Lack of uniform outcome measures
Future research should aim at providing PAC discharge recommendations for middle age and older populations post total joint arthroplasty.

There is a need to obtain more RCT’s on this subject.

Also, determining the effect of comorbidities, caregiver status/availability, and home environment on discharge disposition for patients.

i.e. Do post acute care routes affect the functional outcomes of patients status-post total joint arthroplasty who have similar comorbid conditions?
Clinical Relevance

- Discharge home is a safer and more cost-effective option for patients after TJA compared to other PAC settings.

- PTs should recommend a discharge to HHC after TJA compared to other PAC settings based on:
  - Decreased episode of care cost
  - Existing evidence in comparable functional outcomes (WOMAC, SF-36, and Oxford Hip Score)
Acknowledgements

Thank you!

- Dr. Tracey Collins, PT, PhD, MBA
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  Certified Strength and Conditioning Specialist
- Dr. Renée Hakim, PT, PhD
  Board-Certified Clinical Specialist in Neurologic Physical Therapy
- The University of Scranton Physical Therapy Department


References (cont)


Appendix
# Tests and Measures Psychometrics

<table>
<thead>
<tr>
<th>Test</th>
<th>ICF-Domain</th>
<th>Populations</th>
<th>MCID</th>
<th>Reliability</th>
<th>Validity</th>
<th>Sensitivity &amp; Specificity</th>
</tr>
</thead>
<tbody>
<tr>
<td>WOMAC</td>
<td>Body Function Activity, Participation</td>
<td>Musculoskeletal Conditions</td>
<td>TKA: 11.5 (10) (6 &amp; 12 months) THA: 25.91, 29.26 (11) (stiffness, pain)</td>
<td>THA &amp; TKA Test-retest: 0.79 (12)</td>
<td>THA &amp; TKR Construct validity: 0.80 (13) (pain subscale to physical function)</td>
<td>Physical Function: 0.51, 0.88 (14)</td>
</tr>
<tr>
<td>SF-36</td>
<td>Body Function Activity, Participation</td>
<td>Musculoskeletal and Neuromuscular Conditions</td>
<td>Not established</td>
<td>Test-retest: 0.80 (15)</td>
<td>Concurrent Validity: 0.81 (16)</td>
<td>Physical Function: 0.34, 0.97 (14)</td>
</tr>
<tr>
<td>OHS</td>
<td>Body Structure, Body Function, Activity</td>
<td>Arthritis, Joint Condition, Pain Management</td>
<td>Osteoarthritis: 6.11 (17)</td>
<td>Test-retest: Adequate, ICC &gt; 0.70 (18) (THR)</td>
<td>Excellent correlation with WOMAC global, pain, and functional sub scales (Spearman’s (r=0.82, 0.81, 0.87) (19))</td>
<td>Not established</td>
</tr>
</tbody>
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