The Relationships Among Medical Insurance Payer Source and Total Knee Arthroplasty Outcomes: A 3-year Retrospective Chart Review

TK Nelson, PhD, PT, J Thompson, DPT, OCS, Cert MDT, V Dasa, MD, D Mercante, PhD, B Bates, SPT, C Broekhuis, SPT
LSU Health New Orleans Health Sciences Center, School of Allied Health Professions, Department of Physical Therapy

Introduction
According to the Center for Disease Control’s National Center for Health Statistics, there were 676,000 total knee arthroplasties (TKAs) performed in the year 2009 compared to 454,652 performed in 2004. It is predicted that this number will rise exponentially as the average lifespan continues to increase. Although TKAs are one of the most common treatments for degenerative osteoarthritis (OA), the outcomes vary greatly among TKA recipients. Multiple factors have been investigated and shown to impact TKA outcomes including age, BMI, years with OA, gender, and ethnicity. Many studies have looked at the impact of payer source on outcomes of different surgeries including total hip replacements, cardiac valve replacements, and appendectomies. Other studies have looked at the impact of payer source on preoperative status and resource utilization of total joint replacements. The purpose of this study was to determine if differences existed in outcomes of patients with differing payer sources of Medicaid, Medicare, and private insurance status-post TKA. It was hypothesized that the functional outcomes of individuals with Medicaid would be lower than those individuals with Medicare and private health insurance.

Subjects
The study population was a convenience sample of 151 adults status post TKA. Twenty-five cases were initially excluded based on ICD9 modifiers (e.g. bilateral procedure) and an additional 37 subjects were excluded because of incomplete functional outcome measure questionnaires. The final sample size that met inclusion/exclusion criteria was 99 patients. Table 1 provides full demographic information on the patients studied.

Table 1: Demographic Information

<table>
<thead>
<tr>
<th>Payer Source &amp; Minor Age</th>
<th>Male (n=31)</th>
<th>Female (n=68)</th>
<th>Total (n=99)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medicare</td>
<td>13 (41.9%)</td>
<td>32 (47.1%)</td>
<td>45 (45.5%)</td>
</tr>
<tr>
<td>Medicaid</td>
<td>5 (29.4%)</td>
<td>15 (47.1%)</td>
<td>20 (41.8%)</td>
</tr>
<tr>
<td>Private Insurance</td>
<td>13 (41.9%)</td>
<td>32 (47.1%)</td>
<td>45 (45.5%)</td>
</tr>
<tr>
<td>Other</td>
<td>10 (32.3%)</td>
<td>16 (23.5%)</td>
<td>26 (26.3%)</td>
</tr>
</tbody>
</table>

Methods
A 3-year retrospective chart review was performed on patients who received a TKA between May 2008 and March 2011 by a single surgeon. Outcomes were compared and stratified according to medical insurance payer source.

Data Collection
Upon receiving approval by the IRB, patient records were accessed and basic demographic information (age, sex, race, and payer source) as well as scores on functional outcomes measures were extracted. The SF-12(physical), WOMAC, and Oxford Knee Score had been administered to patients pre- and postoperatively as well as at their 6, 12, and 24 week post-op appointments.

Data Analysis
The MIXED procedure from Statistical Analysis System, Version 9.2 (SAS) was used to assess the associations between each of the response variables (SF-12 Physical & Mental, WOMAC and OKS) and selected predictor variables in a linear mixed effects model which adjusted for serial correlations across time (0, 6, 12 and 24 weeks). Independent predictors included sex, race, age, and payer source. All statistical testing was performed at the 0.05 level of significance.

Results
All subjects regardless of payer source reported a statistically significant (p<0.05) improvement in their overall functional outcome score over time. The SF on the SF-12 Mental, which were only marginally significant at p<0.05. The average score changes over time and associated p values for each outcomes measure can be seen in Table 2 below. There were statistically significant (p<0.05) differences between subjects with private insurance and Medicare on the SF-12 Physical and OKS (Figures 1 & 4). There was also a statistically significant difference between subjects with private insurance and Medicare on the WOMAC (Figure 3). There were not any statistically significant differences between the means of any payer sources on the SF-12 Mental (Figure 4), although there was a marginally significant difference between subjects with Medicaid and subjects with private insurance (p=0.0689).

Discussion
Our findings support our initial hypothesis that Medicaid beneficiaries would have significantly lower functional outcomes than beneficiaries with private insurance. Additionally, we found that Medicare recipients also had significantly worse outcomes than beneficiaries with private insurance. Subjects with Medicaid or Medicare reported lower physical health, lower function, and more pain. Based on results provided through the WOMAC, subjects with Medicare documented a higher degree of disability when rating their physical function. Our findings are consistent with a previous research study performed by Hinman et al, where subjects with Medicaid had lower clinical outcomes and functional scores after THA compared to those subjects with private insurance or Medicare. This is similar to our findings in that our subjects with Medicaid had lower functional outcomes than those with private insurance. It is important to note that unlike the previous study, the patients we investigated with Medicare had significantly worse outcomes than those with private insurance, as well as those with Medicaid. Lavernia, et al. found that African Americans had lower functional scores on the WOMAC and SF-36 general health, bodily pain, and social function scales. Our study found similar findings utilizing the SF-12 Physical.

Limitations
The major limitations of this study dealt with data collection. Since it was a retrospective chart review, the researchers had no control on the method or consistency of data collection. After accessing the patient files and gleaning the data, it was noticed that there was a plethora of missing data. Suggalions were made to the surgeon on ways to improve data collection in the future to assure for more consistent findings. The missing data also impacted the choice and design of the data analysis models utilized.

Conclusion
Our findings suggest that payer source has a key role in predicting postoperative functional outcome scores. Future research is needed to determine what factors improve data collection with payer source which may lead to the poorer outcomes found in the study.

Table 2: Functional Outcome Measures Score Changes Over Time

<table>
<thead>
<tr>
<th>Functional Outcome Measure</th>
<th>Payer Source</th>
<th>Post-op</th>
<th>Pre-op</th>
<th>p-value over time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medicare</td>
<td>29.34 ± 7.6</td>
<td>36.56 ± 2.78</td>
<td>0.0000</td>
<td></td>
</tr>
<tr>
<td>Medicaid</td>
<td>28.08 ± 2.3</td>
<td>36.43 ± 2.68</td>
<td>0.0000</td>
<td></td>
</tr>
<tr>
<td>Private Insurance</td>
<td>32.25 ± 2.49</td>
<td>40.92 ± 2.49</td>
<td>0.0000</td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>30.97 ± 2.49</td>
<td>40.92 ± 2.49</td>
<td>0.0000</td>
<td></td>
</tr>
</tbody>
</table>

Conclusion
When comparing races on their functional outcome measure scores over time, the only significant difference found was between Whites and African Americans on the SF-12 Physical (p<0.0046). No other significant differences existed between races on any of the other outcomes tools.

When comparing races on their functional outcome measure scores over time, the only significant difference found was between Whites and African Americans on the SF-12 Physical (p<0.0046). No other significant differences existed between races on any of the other outcomes tools.

References