Skilled Nursing Facility Partnerships May Decrease 90-Day Costs in a Total Joint Arthroplasty Episode Under the Bundled Payments for Care Improvement Initiative

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ABSTRACT

Background: The Bundled Payments for Care Improvement initiative was developed to reduce costs associated with total joint arthroplasty through a single payment for all patient care from index admission through a 90-day post-discharge period, including care at skilled nursing facilities (SNFs). The aim of this study is to investigate whether forming partnerships between hospitals and SNFs could lower the post-discharge costs. We hypothesize that institutionally aligned SNFs have lower post-discharge costs than non-aligned SNFs.

Methods: A cohort of 615 elective, primary total hip and knee arthroplasty subjects discharged to an SNF under the Bundled Payments for Care Improvement from 2014 to 2016 were included in our analysis. Patients were grouped into one of the 3 categories of SNF alignment: group 1: non-partners; group 2: agreement-based partners; group 3: institution-owned partners. Demographics, comorbidities, length of stay (LOS) at SNF, and associated costs during the 90-day post-operative period were compared between the 3 groups.

Results: Mean index hospital LOS was statistically shortest in group 3 (mean 2.7 days vs 3.5 for groups 1 and 2, $P = .001$). SNF LOS was also shortest in group 3 (mean 11 days vs 19 and 21 days in groups 2 and 1 respectively, $P < .001$). Total SNF costs and total 90-day costs were both significantly lower in group 3 compared with groups 1 and 2 ($P < .001$ for all), even after controlling for medical comorbidities.

Conclusion: Institution-owned partner SNFs demonstrated the shortest patient LOS, and the lowest SNF and total 90-day costs, without increased risk of readmissions, compared with other SNFs.

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By the year 2030, the numbers of total hip and total knee arthroplasties preformed in the United States are projected to increase by 174% (572,000) and 673% (3.48 million), respectively [1]. Given the costs associated with this rising demand, the Center for Medicare and Medicaid Services (CMS) created the Bundled Payments for Care Improvement Initiative (BPCI), to help control costs and improve quality of care associated with different clinical episodes including total joint arthroplasties. BPCI success as a voluntary alternative payment model led to CMS instituting the mandatory Comprehensive Care for Joint Replacement (CJR) model in April 1, 2016. Under CJR and BPCI, target prices are compared against expenditures within a clinical episode, and a set amount of payment is allotted to cover all the care associated with a patient from index admission for lower extremity primary total joint arthroplasty to 90 days after hospital discharge [2]. Post-discharge costs including those associated with discharge to a skilled nursing facility (SNF) are included in the total episode of care cost [3,4]. Up to 40% of costs associated with total joint arthroplasty (TJA) are incurred in the post-discharge period including SNF costs [5]. Given the CJR reimbursement structure, it is critical for providers to target and lower the costs associated with SNF dispositions [6].
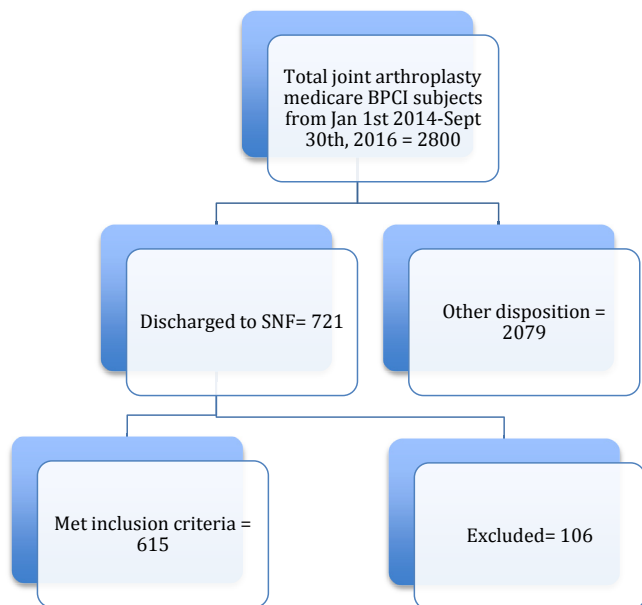
Fig. 1. Flowchart depicting study sample inclusion from the analyzed Medicare claims data of Bundled Payment for Care Improvement Initiative patients (January 1, 2014 to September 30, 2016) obtained from CMS. From this time period, 85% of all the subjects discharged to SNF were included.

While comparisons of clinical outcomes between home and SNF discharges have been studied [7,8], the factors contributing to the variability in costs and outcomes at different SNFs remain unclear. Partnerships between hospital institutions and SNFs serve as one way for both parties to align their interests and goals. Such partnerships have been shown to improve the quality of care for patients with SNF disposition through development of evidence-based care pathways, improved alignment of care goals, and improved communication with the surgical team [9]. Under these partnerships, patient lengths of stay (LOSs), levels of care, and daily rates for patients have the potential to be optimized to benefit both parties. The aim of our study is to investigate whether forming partnerships between hospitals and SNFs with the united goals of improved care coordination and appropriate LOS could lower post-discharge costs within the bundled payment period of 90 days. We hypothesize that partner SNFs that share these goals have lower costs than non-partner SNFs during this period.

Materials and Methods

Study Design and Population

We analyzed an institutional review board-approved, CMS supplied database of Medicare claims, specific to our institution's BPCI patients, from the period of January 1, 2014 to September 30, 2016. All patients treated at our high-volume, urban, academic center with elective primary total hip or knee arthroplasty and discharged to an SNF under BPCI during that period were included in this study. Subjects identified during that period were excluded: if they were discharged to a disposition other than SNF, underwent total joint arthroplasty for femoral neck fracture, underwent partial hip or knee arthroplasty, if there was no available data on inpatient or post-discharge costs, and if they did not have complete follow-up on cost and readmission data 90-days post-operatively. Using our criteria, 615 subjects were included in this study (Fig. 1). The study sample was stratified into 3 main groups: group 1: subjects discharged to a non-partner SNF; group 2: those

discharged to an SNF that is a partner with the institution through a formal agreement; and group 3: those who were discharged to one particular SNF that is owned by the institution. In group 2, agreement-based partnerships were established through a letter of agreement between the SNF and our institution. Although there was no formal contract or financial accountability, the agreement was a commitment from the SNF to develop and implement standard care pathways, maintain unified goals of care, enhanced care coordination, and responsiveness to our institution's clinical care coordinators. Regular meetings with leaders from our institution and the partner facilities took place. Partner SNFs were selected based on the volume of patients historically discharged to certain facilities, geographic location, existing strategic relationships with these facilities, physician preferences ,and the quality of care provided based on CMS rating. Patient disposition to an SNF in one of those 3 groups was based on factors that could not be ascertained, such as patient preference and social work correspondence.

The primary variables of interest were the LOS at the SNF and associated costs in the 90-day post-operative period. Demographic and comorbidity variables, post-operative hospital LOS, SNF LOS, readmissions, type of readmissions (TJA related or unrelated) and associated costs were compared between the 2 study groups. TJA-related readmissions included any diagnosis related to the index surgery including wound complications, prosthetic joint infection, and pulmonary embolism. TJA unrelated readmissions included medical diagnoses such as myocardial infarction, gastrointestinal disorders, and falls with injuries unrelated to the joint replaced. The medical comorbidities analyzed included diabetes mellitus, coronary artery disease, congestive heart failure, chronic kidney disease (CKD), chronic obstructive pulmonary disease, active smoking, and American Society of Anesthesiologists (ASA) class. Given that cost information is proprietary to our institution, only percentage costs using a reference group were reported using group 1 (non-partners) as the reference group, but the actual monetary amounts were not disclosed.

Statistical Analysis

Descriptive analysis of demographic and comorbidity variables was conducted and stratified by partnership group. Categorical variables were compared between groups using Pearson chi-squared analysis. Continuous variables including cost differences and LOS were compared between the groups using one-way analysis of variance, with a statistical significance alpha level of 0.05. A post hoc LOS analysis was also performed after excluding outlier subjects with LOS beyond 1 standard deviation above the mean (31 days). This was done to eliminate possible confounding of average LOS by outlier subjects who may be kept longer by SNFs to collect the maximum 21 day (100% per day) and the 50% until day 42 payment from Medicare. The associations among SNF LOS, costs, and group of SNF were also analyzed in a linear regression analysis controlling for comorbidity variables to adjust for potential confounding. SPSS version 23 was used to compute the analysis.

Results

In the study sample of 615 subjects, the mean age was 75 ± 8 years, 475 subjects were female (77%), 140 male (23%), 348 subjects had total knee arthroplasty (57%), and 267 had total hip arthroplasty (43%). Subjects had an average index hospital LOS of 3.4 ± 2 days and were discharged to one of 97 different SNFs. The overall mean LOS at SNF was 18.9 ± 12 days, and the readmission rate within 90 days was 9% (55 subjects). Of the total sample, 317 (52%) patients were discharged to a non-partner SNF (group1), 222 (36%) were discharged to agreement-partner SNFs (group 2), and 76