Innovations in Shared Decision Making and Patient Engagement: Examining Disparities in Knee Osteoarthritis Using a Markov Model
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Introduction: There are well-documented disparities in the development of knee osteoarthritis (OA) as well as in the utilization of treatment across gender, racial and ethnic groups in the United States. A better understanding of the costs and health implications of disparities in treatment can help all healthcare decision makers (e.g. patients, providers, employers, population health policymakers) improve outcomes. Engaging patients with an effective shared decision-making tool tailored to their gender, race/ethnicity and educational level may decrease such disparities by assisting patients in making more informed health care decisions.

Description of Practice Innovation: We used a Markov model to compare the lifetime costs and effectiveness of different treatment sequences for knee osteoarthritis (OA) among different patient populations and to quantify the costs of racial, ethnic, gender and socioeconomic disparities in treatment for knee OA. A set of common treatment sequences for stages of knee OA were constructed. Direct costs were based on Medicare reimbursement rates and estimates of private insurance and Medicaid rates. Indirect costs, or lost income, were derived from the Medical Expenditure Panel Survey. We applied a 3% discount rate to costs and benefits to account for the 40-year time horizon of the model. The model produces estimates of costs and benefits over the lifecycle. Feedback from focus groups indicates that patients find shorter time periods of 3, 5 and 10 years more useful in decision making.

Impact: Our results show that disparities for treatment of knee OA are costly. Regardless of treatment pathway, African American women experience the greatest lifetime cost and greatest additional cost to delaying treatment. Failing to obtain effective treatment or delaying effective treatment increases costs and limits benefits for all groups. Lost income due to lower labor market productivity is a substantial proportion of the lifetime costs of knee OA. Population simulations demonstrate that as the racial and ethnic disparity in treatment utilization widens, the societal costs of knee OA increase.

Implication: Disparities have not before been examined using a Markov modeling approach, which allows us to compare the lifetime costs and effectiveness for knee osteoarthritis (OA) treatment sequences among different patient populations and to quantify the costs of racial, ethnic, gender and socioeconomic disparities in treatment for knee OA. By linking expected outcomes and costs to individual patient characteristics, we believe this innovative application of cost modeling methodology represents the next generation of instruments for shared decision-making and promotion of patient engagement.