Total knee arthroplasty (TKA) is one of the fastest-growing elective surgical procedures in the United States. For years, researchers and public health professionals have documented marked disparities between black and non-Hispanic white patients in overall use of TKA. It is also known that racial/ethnic and sex differences exist in the timing of TKA, as measured by disease severity, patient preferences, and post-TKA outcomes.

In addition to pain, functional debilitation is a key clinical indication for undergoing TKA. Previous studies have shown minority patients' lower preference rate for seeking joint replacement surgery, with cultural factors associated with individuals’ perceptions of disease management and surgical outcomes. Prior to the article by Cavanaugh et al., few studies have examined disparities in post-TKA functional outcomes and their association with poorer preoperative physical function (PF) and postoperative recovery. This study uses longitudinal analyses of data collected before and after TKA to evaluate trajectories of PF by race/ethnicity after surgical intervention. The authors document the racial/ethnic disparities in both presurgical and postsurgical patient-reported PF. Specifically, black women reported lower preoperative and postoperative PF scores than white women. Moreover, Cavanaugh et al. identify that black women's poorer preoperative PF scores are largely associated with poorer physical function after TKA.

In secondary analyses of Women's Health Initiative data linked to data captured in the fee-for-service Medicare files, Cavanaugh and colleagues examine preoperative and postoperative health among 10,325 US women who underwent TKA between 1993 and 2014. A median of nine 36-Item Short Form Health Survey PF measurements were recorded per participant over time. Owing to the asynchronous collection of PF data, generalized linear mixed modeling was used to estimate the PF score 1 year prior to TKA, when the measure was not available. The authors modeled annual preoperative and postoperative PF for the decade before and after TKA. This novel longitudinal approach estimates the expected measures and the interpolation of these measures to generate complete data despite varied measurement intervals. The methods are comprehensive and well explained.

Compared with white women, black women had more severe symptoms of degenerative joint disease across all pre-TKA years. Similarly, trajectory analyses showed more advanced pain and functional limitations (lower PF scores) across the years before TKA for black women compared with white women. Also, compared with black women, white women had a shorter period between the onset of advanced symptoms and undergoing TKA. Black women also reported more comorbidities and a higher mean BMI at the time of surgery. After adjustment for comorbidities, Cavanaugh et al. found that the absolute differences between the PF scores for white women and the PF scores for black women at 1 year, although statistically significant, did not reach clinically meaningful differences (~3.2 points on a 100-point scale).

In longer-term post-TKA analyses, it is not clear why black women reported lower 1-year functional scores when no significant racial/ethnic differences were observed 3 years after surgery. The measurement of PF may be associated with this confusion because only generic measures of PF were available (ie, measures that may be associated with medical and musculoskeletal comorbidities in addition to knee arthritis).

Although the major strength of this study is the longitudinal analysis of functional outcomes, several limitations should be considered when interpreting the findings. First, the analyses are limited to women of Medicare age. In addition, the small number of self-identified Hispanic...
participants limited generalizability among Hispanic women. Future research should examine functional trajectories among black men and other racial/ethnic minority groups. Furthermore, almost one-half of TKA procedures in the United States are performed on patients younger than 65 years and Medicare data do not address TKA use and timing among working-age adults.

The analytic approach and the clear patterns within the longitudinal data make the findings of this study important. Future studies should consider replicating these findings using longitudinal methods in a cohort of patients that includes a sufficient number of men, patients younger than 65 years, and patients of Hispanic ethnicity. These studies should consider an in-depth analysis of how baseline comorbidities, severity of disease at presentation, and social determinants of health are associated with variation in racial/ethnic and sex outcomes after TKA.

ARTICLE INFORMATION
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REFERENCES: