Completion of Patient-Reported Outcomes Measures Improved with Use of an Arthroplasty-Specific Mobile Application – Results from a Randomized Controlled Trial

Matthew David Miller[1], Roberta E Redfern[2], Mike Anderson[2], Scott H Abshagen[2], David C. Vanandel[2], Jess H Lonner[3]
[1]Stanford University, [2]Zimmer Biomet, [3]Rothman Orthopaedic Institute

INTRODUCTION:

The collection of patient-reported outcome measures (PROMs) has historically been reported as costly and time-consuming, with low compliance rates that may impact reimbursement. Research investigating the effects of mobile applications to support PROMs collection following arthroplasty is sparse.

METHODS:

Secondary analysis of data from a multicenter randomized controlled trial was performed. Patients undergoing knee or hip arthroplasty were randomized to utilize a smartphone-based care management platform (app) for self-directed rehabilitation and completing joint-specific PROMs (HOOS JR/KOOS JR) via the application at prescribed intervals or on paper during clinic visits. Control patients received practice standard of care and completed PROMs via emailed hyperlink or during clinic visits. Compliance with protocol-defined timepoints were calculated through one year postoperatively. Comprehensive Joint Replacement (CJR) submission rules (preoperative PROMs -90 – 0 days and postoperative PROMs 270-425 days) were also applied to compare compliance by group assignment. Patients were categorized by age (65 years or older) to determine the rate of compliance and electronic completion of surveys within Medicare-eligible subjects.

RESULTS:

Totals of 384 and 451 patients in the app and control groups, respectively, were eligible for analysis. Age (62.6±9.6 vs. 63.3±9.5, p=0.35), sex (59.4% vs 58.9% female, p=0.87), and procedure (p=0.91) were similar between arms. Compliance was higher in the app group preoperatively (97.1% vs. 87.6%, p<0.0001) and at every timepoint postoperatively, including at one year (71.7% vs. 51.6%, p<0.0001). This trend persisted across procedure types. On logistic regression, including age, sex, procedure, and preoperative PROMs scores, intervention arm was the strongest predictor of completion of all PROMs, where app users were 4.4 times more likely to be compliant at all timepoints (OR 4.493, 95%CI 3.302 – 6.113, p<0.0001). Similarly, app users were twice as likely to be compliant with CJR guidelines (OR 2.08, 95%CI 1.515 – 2.856, p<0.0001). The majority of patients in the app group (77.5%) completed PROMs using the application as opposed to paper methods. In this cohort, patients older than 65 years exhibited higher compliance at all timepoints than those <65 years of age. Significantly higher CJR compliance was observed in patients over 65 in the app group compared to the control group (74.1% vs. 52.2%, P,0.0001). Considering patients who were compliant with CJR timeframes for pre- and postoperative PROMs, only 9.5% of patients ≥65 years completed surveys electronically via hyperlink whereas 66.7% of patients in the intervention arm completed both surveys within the mobile application (p<0.0001).

DISCUSSION AND CONCLUSION:

A smartphone mobile application that engages patients during recovery after knee and hip joint arthroplasty improves compliance with completion of pre- and postoperative PROMs compared to other electronic and paper collection methods.