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**Abstract**

# Improving Orthopedic Care Delivery Through Digital Engagement

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**Abstract**

**Background:** Patient activation has been hypothesized to improve medical and surgical outcomes by increasing patient involvement in the care plan. We tested this hypothesis by utilizing a patient activation tool in a population of adults having total hip or total knee replacement. We hypothesized that patient activation would be associated with increased discharge to home as opposed to a skilled nursing facility, reduced hospital length of stay, decreased inpatient readmissions, and decreased emergency department (ED) visits.

**Objective:** Using an email patient activation tool, we sought to increase patients' involvement in their care before and after total joint replacement. Outcomes examined included day of surgery cancellation, length of hospital stay, discharge to home vs discharge to a skilled nursing facility, any ED visit within 30 days of discharge, and any inpatient readmission within 30 days of discharge.

**Methods:** This was a quasi-experimental design comparing Jan-Jun 2017 to Jan-Jun 2018. We instituted an email patient activation tool for all patients with total knee or total hip replacement surgery beginning in January 2018. This tool was integrated with the electronic medical record system during the six month study period and patients could opt out at anytime if they desired. The tool was designed to prepare patients both educationally and emotionally for their operation with multiple easy-to-read emails starting from the time they were scheduled for surgery through six months postop. Percent of emails opened and clicked were used as measures of engagement for the intervention participants.

**Results:** Of the 2,027 TJR patients included, 720 were hip patients and 1,307 were knee patients. Pre- and postintervention groups were similar in gender and age. For hip replacement patients, length of stay was nearly 1/4 day lower in the postintervention group ( $\beta=-0.23$ ;  $P=.001$ ) after adjusting for gender, age and insurance; ED visits were lower among the postintervention group (OR=0.45;  $P=.05$ ) after adjusting for gender, age and insurance; and postintervention patients were less likely to have day of surgery cancellation, any revisit (ED or readmission), and were more likely to be discharged home. However, these associations did not reach statistical significance.

**Conclusions:** Among patients who received the intervention, higher engagement was significantly associated with positive changes in almost all outcomes. Use of the digital patient activation tool demonstrated significant savings in length of stay and reduced ED visits among hip replacement patients. Although just under 50% of patients in the intervention group were enrolled to use the tool, these findings were still significant even when non-participants were included in the postintervention group.

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**KEYWORDS**

mobile technology; patient activation; patient education; digital engagement

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