Patient-Reported Outcomes Demonstrate The Value Of Non-Operative And Operative Orthopedic Treatments And Predict The Odds Of Improvement With Surgery

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Category: Outcomes Measurement

Keywords: Patient Reported Outcomes PROMIS Computer Adaptive Testing

Introduction/Purpose: The importance of patient reported outcomes (PROs) has become increasingly recognized as an important tool to measure our clinical value. The National Institute of Health (NIH) created the Patient-Reported Outcomes Measurement Information System (PROMIS), a series of validated item banks, to help clinicians and researchers measure key clinical domains. The PROMIS computer adaptive tests (CAT) may be administered with minimal resources or administrative burden. This study describes the results of administering computer adaptive tests (CAT) to every patient in a high volume Orthopedic Surgery practice. We test the hypotheses that both non-operative treatment and operative treatments improve PRO scores. Furthermore, we test the hypothesis that preoperative scores in these domains may be used to predict chances of improvement after surgery.

Methods: The PROMIS CAT was administered prospectively for all patients as part of standard clinic intake and recorded in the patient’s electronic medical record (EMR) at each clinic visit. The PROMIS item banks are normalized to mean 50±10 for the US population. De-identified data was retrospectively extracted from the EMR including PROMIS scores, demographic information, as well as surgery specific information. As of this submission, 1688 PROMIS CATs from March 2015 to September 2016 have been analyzed.

Data for initial and final clinic visits, as well as for the final preoperative visit for patients who had surgery, are compared using Wilcoxon Matched Pairs Test for paired samples and Mann-Whitney U Test for unpaired samples. Linear regression is used to assess the association of initial values to change in value after treatment. The effect of stratified initial domain value on odds of improving with surgery is assessed using Analysis of Variance.

Results: Non-surgical and surgical patients present with similar pain intensity (49.6±7.9 vs. 49.4±7.8). Surgical patients do not improve prior to surgery, but both improve by their final visit (45.7±7.5, 43.7±8.8, p<0.05).

Non-surgical and surgical patients present with similar pain interference (60.0±8.4 vs. 60.3±8.9). Surgical patients do not improve prior to surgery, but both improve by their final visit (56.9±8.8, 54.3±9.4, p<0.05).

For surgical patients, change in pain intensity and pain interference correlate with initial values (R2 0.32 and 0.27, p<0.05). The percentage whose pain intensity improves after surgery when initial value is over one SD worse than mean is 96%, within one SD worse than mean is 81%, within one SD better than mean is 56%, and over one SD better than mean is 40% (p<0.05).

Conclusion: Both non-operative and operative orthopedic treatments improve patient reported pain intensity and pain interference.

For patients that have surgery, patients that present with more severe symptoms tend to improve more with surgery. Furthermore, the odds of improving after surgery can be calculated based on preoperative PRO scores. This may allow surgeons to counsel patients about the potential benefits of surgery with personalized precision that is currently unavailable. Measuring PROs using PROMIS CATs demonstrates the value of both non-operative and operative Orthopedic Surgery care for our patients. Preoperative PRO scores may predict the odds of successful surgical intervention.
Patient-Reported Outcomes Measurement Information System (PROMIS) pain intensity scores for surgical (open circle) and non-surgical (square) patients at their initial clinic visit, last pre-operative clinic visit for surgical patients, and final clinic visit. The dashed line and grayed area represents the mean and standard deviation for the whole patient population. *Pain intensity at initial visit is different than at final non-operative or post-operative visit (p<0.05). †Pain intensity at last pre-operative visit for surgical patients is different than at final non-operative visit for non-surgical patients (p<0.05). No difference was demonstrated between surgical and non-surgical patients at the initial visit or at the final non-operative / post-operative visit. No difference was demonstrated for surgical patients between the initial visit and the last pre-operative visit.