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Patient Engagement Approaches in Total Joint Arthroplasty: A Review of Two Decades

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Abstract

Patient engagement is a comprehensive approach to health care where the physician inspires confidence in the patient to be involved in their own care. Most research studies of patient engagement in total joint arthroplasty (TJA) have come in the past 5 years (2015-2020), with no reviews investigating the different patient engagement methods in TJA. The primary purpose of this review is to examine patient engagement methods in TJA. The search identified 31 studies aimed at patient engagement methods in TJA. Based on our review, the conclusions therein strongly suggest that patient engagement methods in TJA demonstrate benefits throughout care delivery through tools focused on promoting involvement in decision making and accessible care delivery (eg, virtual rehabilitation, remote monitoring). Future work should understand the influence of social determinants on patient involvement in care, and overall cost (or savings) of engagement methods to patients and society.

Keywords

shared decision making, patient engagement, decision aid

Introduction

While the demand for total joint arthroplasty (TJA) has been increasing, there are growing concerns around postoperative variation in outcomes and health care costs.[1-3] Applying surgery to an appropriate clinical setting remains challenging, as there is no consensus on TJA candidacy. For example, one prior study found a third of total knee arthroplasty surgeries were deemed to be inappropriate.[4]

Many in orthopedic surgery, like other fields in medicine, are working towards a transformation where patients are at the center of the health care team. Patient engagement should be a comprehensive approach to health care where the physician inspires confidence in the patient to be involved in his or her own care. Greater involvement of patients in their care (ie, patient activation) promotes met expectations and alignment of care with their preferences and values. This may help guide care teams by shifting patients who will not gain meaningful improvement from surgery to nonoperative management. For surgical candidates, patient engagement may improve preoperative risk factor optimization (eg, weight loss or smoking cessation) and postoperative adherence (eg, completing physical therapy).

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Materials and Methods

Literature Search

A comprehensive search was conducted using PubMed/MEDLINE, Embase, and the Cochrane Library databases. The following MeSH terms and keywords were used to search the titles of published literature: "total hip arthroplasty," "total knee arthroplasty," "total joint," "knee prosthesis," "hip prosthesis," "surgery," "total hip replacement," "total knee replacement," "partial/unicompartmental," "hip resurfacing," "patient involvement," "shared decision making" "patient engagement," "patient experience," "patient participation" "decision aid," "technology," " mobile application," and

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"media" in combination with the "AND" or "OR" Boolean operators. Additionally, reference lists of relevant studies were scrutinized. Data extraction included study data, study design, type of engagement, and study conclusions.

Inclusion criteria were (i) studies published between 2000 and August 2020, (ii) English language publications and complete articles from peer-reviewed journals, and (iii) orthopedic patients under consideration for total hip and total knee arthroplasty. Exclusion criteria were (i) protocols established for future research (ii) studies involved in solely the development of patient engagement method, rather than their evaluation, and (iii) and case studies.

Data Acquisition

The initial query yielded 2534 articles. The screening was centered around whether the study evaluated a patient engagement method. Two reviewers (AA and DB) working independently and in duplicate screened all titles and abstracts; except for records in which both reviewers agreed to exclude, all other records were retrieved in full text. These reviewers screened full-text articles using the same procedure with acceptable reproducibility for all decisions. Disagreements were resolved by consensus. Applying inclusion and exclusion criteria resulted in 31 manuscripts included for analysis. Engagement methods were categorized as those focused on decision making (decision aids), and engagement methods which utilized technological support (virtual physical therapy/remote education, care pathway management, remote monitoring).

Analysis included collection of publication year, engagement method, care delivery phase (clinic visit [decision making], follow-up [remote monitoring, nonoperative management], or postoperative), study design, relevant results/outcomes of the study, and reported conflict of interest. A review of each study's reference lists was performed but did not result in any additional articles being considered for our investigation (Figure 1).

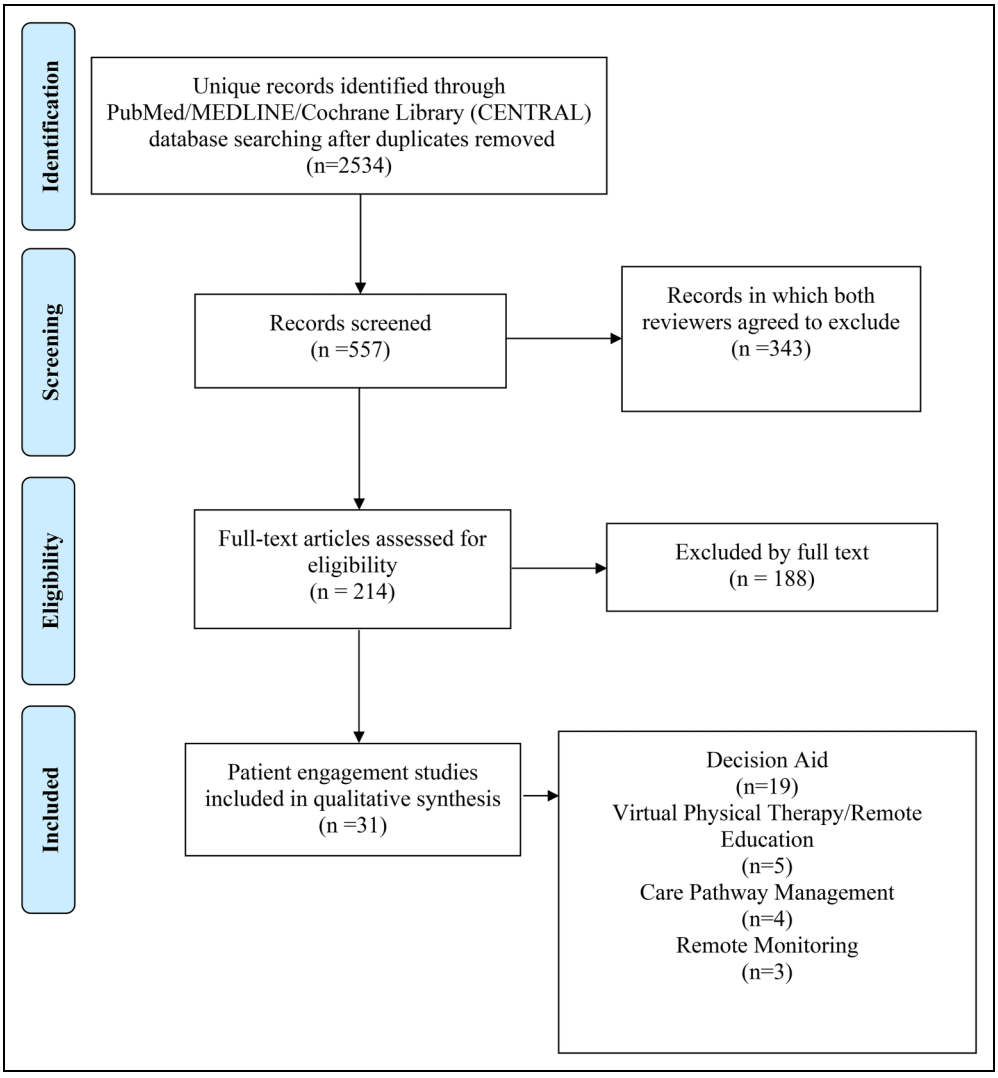

Figure 1. Diagram depicting the selection process for article inclusion.

Table 1. Overview of All Studies Included in Review.

Study by publication year	Engagement method	Care delivery phase	Study design	Results	Relevant outcomes	Conflict of interest/ disclosure
Prvu Bettger et al[5]	Technological support (virtual physical therapy)	Postoperative	Randomized	Virtual physical therapy was noninferior in function and had lower costs of care.	Physical function, cost	Yes
Hurley et al[6]	Decision making (decision aids)	Clinic visit	Cohort	Older patients and patients with high pain levels had an increased preference for surgery. Further, engagement of patients in SDM via decision aids in primary care versus specialty care may impact patient preferences for surgery.	Treatment preference	No
Trenaman et al[7]	Decision making (decision aids)	Clinic visit	Randomized	At 2-years most patients (73.9% decision aid arm and 79.1% control) had surgery. At 7 years, patients exposed to decision aids had a similar likelihood of undergoing surgery and mean per-patient costs compared to those without decision aid.	Treatment preference, cost	No
Hoogland[8]	Technological support (virtual physical therapy)	Postoperative	Observational	A home-based rehabilitation program (tablet app and mobility monitoring) had good adherence (92%) and positive patient experience.	Treatment adherence, patient experience	Yes
Sepucha et al[9]	Decision making (decision aids)	Clinic visit	Randomized	The majority (67.2%) made informed patient-centered decisions. Knowledge scores were higher for the short decision aid group ($P < .001$). Surgeons reported the majority of the visits were of normal duration or shorter.	Knowledge of condition, visit duration	Yes
Cronström et al[10]	Technological support (remote education)	Follow-up	Qualitative	Studied digital program aimed at reducing symptoms of osteoarthritis in patients who opt for nonoperative treatment. Participation in program leads to some patients changing their attitude about TJA and treatment options.	Physical symptoms, treatment preference	Yes
Mangla et al[11]	Decision making (decision aids)	Clinic Visit	Randomized	Comparison of decision aids between 2 vendors (DA-A vs DA-B). Despite having different content and formats, the 2 decision aids had similar overall effectiveness.	Knowledge of condition, treatment preference	Yes
Wang et al[12]	Technological support (virtual physical therapy)	Postoperative	Meta-analysis	Technology-assisted rehabilitation results in statistically significant improvement in pain, but no difference in hospital readmissions or treatment-related adverse events.	Patient-reported pain, hospital readmission, adverse events	Yes

(continued)

Table 1. (continued)

Study by publication year	Engagement method	Care delivery phase	Study design	Results	Relevant outcomes	Conflict of interest/ disclosure
Higgins et al[13]	Technological support (care pathway management)	Postoperative	Case control	Patients in the patient engagement (PES) cohort had a statistically significant shorter mean length of stay ($P < .001$). PES was also associated with a statistically significant reduction in rates of reoperation ($P = .031$).	Hospital duration, reoperation	Yes
Gollish et al[14]	Technological support (remote monitoring)	Follow-up	Cohort	Use of mobile applications improves patient experience and reduces follow-up calls to surgeons' offices.	Patient experience, follow-up calls	No
Yahanda et al[15]	Technological support (remote monitoring)	Follow-up	Cohort	The use of telemonitoring text and voice messaging interventions for an 88-week period to engage patients (instead of nurses calling patients) lead to increased savings and return of investment.	Patient experience, cost	No
Doiron-Cadrin et al[16]	Technological support (virtual physical therapy)	Postoperative	Randomized	Patients participating in tele-prehabilitation reported high satisfaction. No difference in patient-reported outcomes when compared to usual in person care.	Satisfaction, patient reported function	No
McDonall et al[17]	Technological support (care pathway management)	Postoperative	Randomized	Multimedia intervention lead to significantly lower mean pain intensity scores postoperatively and reduced length of hospital stay ($P = .04$). Use of technology-enhanced patient activation ($P = .04$), leads to higher satisfaction with care ($P = .01$), and a higher likelihood to refer others to health services ($P = .02$).	Patient-reported pain, hospital length, satisfaction, patient experience	No
Castle et al[18]	Technological support (remote monitoring)	Follow-up	Methods comparison	Found to be a reliable measure of knee range of motion to remotely monitor patients.	Patient experience, range of motion	No
Boland et al[19]	Decision making (decision aids)	Clinic visit	Randomized	Patients who used the decision aid were more likely to make better-quality decisions at an academic site compared to community site. Academic site also had longer consultations and more verbal education.	Decision quality, visit duration	Yes
Sepucha et al[20]	Decision making (decision aids)	Clinic visit	Cohort	Decision aid use was associated with higher knowledge scores and shared decision making. Most patients received their preferred treatment (no difference by decision aid use). Surgical rates were lower for those who received decision aids.	Knowledge of condition, treatment preference	Yes

(continued)

Table 1. (continued)

Study by publication year	Engagement method	Care delivery phase	Study design	Results	Relevant outcomes	Conflict of interest/ disclosure
de Jesus et al[21]	Decision making (decision aids)	Clinic visit	Prospective	77.8% of patients reported that the decision aid helped them make decision between unicompartmental knee arthroplasty and total knee arthroplasty.	Treatment preference	Yes
Trenaman et al[22]	Decision making (decision aids)	Clinic visit	Randomized	The use of decision aid leads to fewer surgeries over the 2-year period reducing cost per patient, while providing additional quality-adjusted life year per patient.	Treatment preference, cost, patient experience (quality-adjusted life year)	No
Zheng et al[23]	Technological support (care pathway management)		Qualitative	Patients liked to be engaged by progress reports and educational advices. Both patients and clinicians found summary reports of symptoms changing over time helpful.	Satisfaction	Yes
Jayakumar et al[24]	Technological support (care pathway management)		Case control	Patient-focused technology-enabled program lead to lower costs for patients and reduced length of stay without impacting outcomes	Hospital length, cost, patient-reported function	Yes
Ibrahim et al[25]	Decision making (decision aids)	Clinic visit	Randomized	Use of decision aid increased rates of total knee replacement among Black patients. However, rates of recommendation for surgery did not differ significantly.	Treatment preference	No
Stacey et al[26]	Decision making (decision aids)	Clinic visit	Randomized	Compared to controls, patients using decision aid had shorter wait times, fewer surgeries, and higher decision quality. Results were not statistically significant.	Visit duration, treatment preference, decision quality	Yes
Barlow et al[27]	Decision making (decision aids)	Clinic visit	Qualitative	Evaluation of how prediction tools impact patient decision making. Found to have better effect earlier in care cycle. May be subject to optimism bias if patients are predicted to have poor outcomes.	Treatment preference	Yes
Shue et al[28]	Decision making (decision aids)	Clinic visit	Randomized	Comparison of 2 decision aids (booklet-only vs booklet with DVD). While both were effective in improving patient knowledge and willingness to participate in the decision process, the addition of the DVD did not statistically improve patient acceptance or knowledge.	Knowledge of condition, treatment preference	No
Washington and Shacklady[29]	Decision making (decision aids)	Clinic visit	Prospective	Patient felt both clinic discussion and decision aid were easy to understand, but the decision aid improved understanding of osteoarthritis.	Knowledge of condition	No

(continued)

Table 1. (continued)

Study by publication year	Engagement method	Care delivery phase	Study design	Results	Relevant outcomes	Conflict of interest/ disclosure
Elwyn et al[30]	Decision making (decision aids)	Clinic visit	Randomized	Shared decision making increased when clinicians used the knee osteoarthritis option grid. There was no increase in encounter duration.	Patient involvement, treatment preference, visit duration	Yes
Youm et al[31]	Decision making (decision aids)	Clinic visit	Randomized	Income, education, and socioeconomic associated with knowledge scores. Private insurance was more likely to come to decision at the first visit.	Knowledge of condition, treatment preference	Yes
Volkmann and Fitzgerald[32]	Decision making (decision aids)	Clinic visit	Cohort	Women responded to decision tool with higher expectations and surgical readiness.	Patient expectations, surgical readiness	No
Stacey et al[33]	Decision making (decision aids)	Clinic visit	Randomized	Patients exposed to decision aid had a statistically significant higher decision quality based on knowledge and quality decision that is consistent with their values for outcomes.	Knowledge of condition, decision quality	Yes
Bozic et al[34]	Decision making (decision aids)	Clinic visit	Randomized	Significantly more patients in the intervention group reached an informed decision during the first visit and reported higher confidence in knowing what questions to ask their doctor. Surgeons reported high satisfaction with efficiency of visit and questions patients asked.	Treatment preference, knowledge of condition	Yes
Weng et al[35]	Decision making (decision aids)	Clinic visit	Cohort	Among African Americans who underwent the intervention (combined educational video and decision aid), pain and physical function improved.	Patient-reported pain, Patient-reported function	Yes

Results

The search identified 31 studies aimed at patient engagement methods in TJA (Table 1).

Engagement Focused on Decision Making

We found 19 engagement methods focused on decision making (decision aids, $n = 19$). Evaluation of engagement focused on decision making was centered around knowledge of condition, treatment preferences, decision quality, and surgical rate. Tools were primarily utilized preoperatively to inform shared decision making. The application of decision aids was found to improve patient knowledge scores, as well as increase patient confidence in knowing what questions to ask their doctors.[9,20,21,34] Stacey et al[33] found that patients exposed to a decision aid made an informed choice that is consistent with their values (56.4% vs 25.0%; $P < .001$).

Overall, authors of the various studies published on patient-focused engagement tools have mostly reported increased patient knowledge, higher confidence, a greater possibility of making an informed treatment decision that aligns with their goals, values, and preferences (Table 1 expands on the conclusions of each study).

Engagement Focused on Technological Support

We found 12 engagement methods which utilize technological support (virtual physical therapy/remote education [$n = 5$], care pathway management [$n = 4$], remote monitoring [$n = 3$]). Themes of engagement methods focused on technology were

functional prerehabilitation/rehabilitation, remote monitoring of patients, educational media, and patient support through care pathway management. Engagement through technological tools was predominantly used postoperatively or to follow-up. Authors of prior studies have reported it may offer a platform to support patient participation in their recovery after TJA.[5,13-15,17] Virtual rehabilitation in one prior study led to better health outcomes and reduced cost burden after TJA. Further, technology-enabled patient engagement solutions may progress quality assessments such as length of stay and rates of reoperation within 60 days.[13]

Overall, authors of the various studies have mostly reported lower costs, shorter length of stays, and higher patient satisfaction and experience (Table 1 expands on the relevant results and outcomes of each study).

Discussion

Slover et al[36] previously noted that, despite the increased attention paid to patient engagement methods, few studies have been directly focused on its impact on TJA. Our review of the past 20 years found that most of the applications of patient engagement methods in TJA have come in the last 5 years (2015-2020), with authors of the various studies reporting a number of benefits (eg, patient-reported outcomes, patient experience and satisfaction, decision-related outcomes, eg, quality, patient involvement, treatment concordance) to all stakeholders with respect to TJA.

Engagement methods focused on decision making have been effective in promoting patient-centered care in TJA. For example, patients exposed to a decision aid made an informed choice that is consistent with their values.[33] This is vital, as treatment decisions tailored to the patient's preferences (patient-centered) may lead to better health outcomes and improved experience (higher satisfaction and met expectations).[20,37] Promising work in artificial intelligence can enhance decision making with generated personalized predictions using prior patient reported outcome measures, patient clinical risk factors, and psychosocial risk factors (depression, patient activation).[38-40] Personalized predictions provide an additional metric to engage patients, and guide discussions about surgical appropriateness and postoperative expectations. Importantly, engagement methods focused on decision making can be introduced into the clinical setting without impacting efficiency of the office visits, which benefits all stakeholders.[9,30,34]

The use of technology (eg, mobile applications or telemonitoring) to enhance patient engagement may play a critical role during various phases of care delivery (follow-up, postoperative). Authors of prior studies have reported it may offer a platform to involve patients remotely and support participation (ie, increased activation) in their recovery after TJA.[5,13-15,17] Virtual rehabilitation may provide a high-value alternative for patients with disability or lack of transportation.[5] Further, engagement methods utilizing technology may improve quality measures such as length of stay and rates of reoperation within 60 days.[13] In addition, mobile and online tools may be used to connect patients with accurate, accessible health information regarding their postoperative course. This may prevent misinterpretation of symptoms. Authors of several studies report this method of engagement may promote a healthy mindset and positive recovery environment, as well as reduce follow-up calls.[14,15,41] Future work should focus on clear clinical guidelines for the indications of a mobile app to engage patients, as well as expansion of mobile feedback mechanism from patients.

Our study was not without limitations. Heterogeneity of the outcome measures and variation in patient engagement methods may limit generalizability. Further, differences in patient characteristics, and geographic settings made it difficult to evaluate and compare papers. However, our findings show that the magnitude of the findings might differ between papers, but the specific associations were mostly aligned between studies.

Conclusions

Based on our review of 31 studies, the conclusions therein strongly suggest that patient engagement methods in TJA demonstrate benefits throughout care delivery. We encourage orthopedic surgeons to continue researching the effect of patient engagement through tools focused on promoting involvement in decision making and accessible care delivery (eg, virtual rehabilitation, remote monitoring). Future work should understand the influence of social determinants on patient involvement in care, and overall cost (or savings) of engagement methods to patients and society.[42,43]

Ethical Review Committee Statement

Institutional Review Board approval is not required.

Statement of Human and Animal Rights

All procedures followed were in accordance with the ethical standards of the responsible committee on human experimentation (institutional and national) and with the Helsinki Declaration of 1975, as revised in 2008.[5]

Informed Consent Statement

Informed consent was not obtained as no individual participants were included in the study.

Disclosures

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Declaration of Conflicting Interests

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