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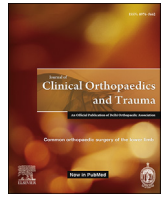
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journal homepage: www.elsevier.com/locate/jcotPatient expectations and satisfaction in orthopaedic surgery: A review of the literature[☆]Ishaan Swarup^{a,*}, Curtis M. Henn^b, Lawrence V. Gulotta^a, R. Frank Henn III^c^a Department of Orthopaedic Surgery, Hospital for Special Surgery, 535 East 70th Street, New York, NY 10021, USA^b Department of Orthopaedic Surgery, Medstar Georgetown Orthopaedic Institute, 3800 Reservoir Road NW, Washington, DC 20007, USA^c Department of Orthopaedics, University of Maryland School of Medicine, 2200 Kernan Drive, Baltimore, MD 21207, USA

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ABSTRACT

Patient expectations have been shown to be an independent predictor of outcomes in clinical medicine. In the orthopaedic literature, the majority of studies have focused on the relationship between pre-operative expectations and post-operative outcomes in patients undergoing total hip arthroplasty, total knee arthroplasty, shoulder surgery, and spine surgery. Various methodologies have been used to assess patient expectations in orthopaedic surgery, including direct questioning, short questionnaires, and validated surveys. Multiple patient factors have been associated with greater expectations prior to elective orthopaedic surgery, and greater pre-operative expectations have been shown to be associated with better subjective and objective outcomes after total hip and knee arthroplasty, shoulder surgery, and spine surgery. While there are very few validated measures of patient satisfaction after orthopaedic surgery, increased post-operative patient satisfaction is consistently associated with meeting pre-operative patient expectations. Given the relationship between pre-operative patient expectations and post-operative outcomes and patient satisfaction, understanding and defining expectations prior to elective orthopaedic surgery may optimize outcomes. In this review, we aim to summarize the current literature on patient expectations in orthopaedic surgery.

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1. Introduction

Patient expectations have been shown to be a significant predictor of outcomes in several clinical specialties. The majority of these studies have shown that greater expectations are associated with better outcomes.¹ The basis of this finding has been attributed to patient psychological factors such as the expectation of outcomes, and its relationship to the success of rehabilitation and levels of post-operative pain and recovery.¹ Recently, a greater emphasis is being placed on patient expectations prior to surgery and patient satisfaction after surgery. While patient expectations are a critical component of the patient–physician interaction, its impact on patient outcomes is starting to be studied in a scientific manner.

There have been several studies focusing on the role of patient expectations on outcomes after elective orthopaedic surgery.

However, the majority of these studies have focused on total hip (THA) and total knee arthroplasty (TKA),^{2–15} shoulder surgery,^{16–18} and cervical and lumbar spine surgery.^{19–28} Using various measures of patient expectations, these studies have attempted to identify patient factors associated with greater expectations, as well as define the effect of patient expectations on outcomes and satisfaction after surgery.

In this systematic review, we aim to provide an overview of the literature and summarize the current state of expectations research in orthopaedic surgery. We describe different strategies to assess pre-operative patient expectations, and identify factors associated with greater pre-operative patient expectations. We also discuss the effect of pre-operative patient expectations on outcomes and satisfaction after orthopaedic surgery. In order to accomplish these objectives, we focused our review on total hip and knee arthroplasty, shoulder surgery, and spine surgery, which are the most commonly studied procedures in the expectations literature. The goal of this review article was to provide orthopaedic surgeons with an understanding of the current literature, improve their ability to counsel patients, stimulate additional research, and potentially improve patient outcomes after surgery.

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2. Methods

We performed a systematic review of studies relating to pre-operative patient expectations in orthopaedic surgery. We conducted an electronic search for studies using Medline, Google Scholar, and the Cochrane Library. The specific search term “patient expectations orthopaedic surgery” was used, and it yielded 400 articles in Medline, 4310 results in Google Scholar, and 3 articles in the Cochrane Library. From these results, we identified studies that focused on total hip or knee arthroplasty, rotator cuff repair, total shoulder arthroplasty, cervical spine surgery or lumbar spine surgery (Fig. 1). We included studies that specifically measured pre-operative patient expectations and either studied factors associated with patient expectations, determined the relationship between patient expectations and outcomes, or discussed the relationship between patient expectations and satisfaction. We excluded studies that did not include the aforementioned subspecialty areas, focused on non-elective orthopaedic procedures, and duplicates. The initial search was conducted in May 2015, but an updated review was performed to include additional articles published through 2017.

The first and senior authors identified all relevant studies, and these studies were re-screened by all of the authors. In all, we selected 17 articles focusing on total hip and knee arthroplasty, 9 articles focusing on shoulder surgery, and 10 articles focusing on spine surgery. We included 5 additional articles focusing on generalized patient expectations in medicine, measurement of patient expectations, and attempts to modify patient expectations.

3. Results

3.1. Total hip and knee arthroplasty

Several retrospective and prospective studies have investigated the effect of patient expectations on outcomes after total hip and knee arthroplasty.^{2–15} Most of these studies have employed varying methodologies to assess patient expectations. For example, Cross et al. used the Hospital for Special Surgery Hip and Knee

Replacement Expectations Surveys.² These surveys were developed and validated by Mancuso et al., and both the hip and knee surveys are comprised of less than 20 items each.^{10,12} Alternatively, Suda et al.,¹⁵ Gandhi et al.,⁴ and Koenen et al.⁸ developed three to six question surveys in order to determine patient expectations. Some of these questions are based on patient outcome measures, however they are not validated.^{8–15} Interestingly, Moran et al. assessed pre-operative expectations by determining the expected improvement in Oxford Hip and Knee Scores by patients.¹⁴ Patients with a greater expected difference were characterized as having higher expectations. Overall, a variety of short surveys have been used in the literature, but very few surveys have been tested for validity and reliability.²⁹

Several factors have been associated with greater pre-operative patient expectations in total hip and knee arthroplasty. Judge et al. studied over 1300 consecutive patients undergoing THA, and found that greater number of pre-operative expectations were associated with younger age, female gender, increasing BMI, and more education.⁷ In comparison, Mancuso et al. found that older patients, men, and patients with worse pre-operative function report higher expectations of THA.¹² With regards to TKA, Hepinstall et al. found that patient age, living situation, history of arthroplasty, and certain outcome measures (KOOS and SF-36) were significant predictors of pre-operative expectations.⁵

Including all total hip and knee arthroplasty patients, Gandhi et al. found that patients that are younger, male, and have a lower BMI report greater pre-operative expectations prior to surgery.⁴ Similarly, Koenen et al. found that female gender and history of arthroplasty contributed to greater expectations.⁸ Interestingly, Mahomed et al.⁹ and Cross et al.² did not find any significant predictors of pre-operative expectations in total hip and knee arthroplasty patients. However, their analyses were limited to smaller sample sizes compared to other studies. In general, previous studies have not identified consistent predictors of expectations in the total hip and knee arthroplasty literature; however, patient age, gender, BMI, education level, pre-operative function, and history of arthroplasty may be associated with patient expectations (Table 1).

Pre-operative patient expectations have been shown to be associated with outcomes after total hip and knee arthroplasty. Cross et al. found that greater expectations were associated with greater improvement in function six months after TKA; however, greater expectations were associated with less improvement in pain three weeks after THA.² Judge et al. found that more pre-operative expectations predicted greater improvement after THA as measured by the WOMAC outcome measure at 12-month follow-up.⁷ Gandhi et al. showed that greater expectation of pain relief predicted greater pain relief at 1-year follow-up after total hip and knee arthroplasty,⁴ and similarly, Mahomed et al. found that expectation of complete pain relief was an independent predictor of better SF-36 physical function scores and pain relief at six months after surgery.⁹ In summary, the current literature shows that overall patient expectations as well as specific patient expectations regarding pain relief predict better short-term outcomes after total hip and knee arthroplasty.

Patient satisfaction is also an important factor in elective total hip and knee arthroplasty. Patient satisfaction after total hip and knee arthroplasty has been reported to be greater than 90% six months after total hip or knee arthroplasty.³⁰ However, the majority of satisfaction studies do not use a standardized assessment of patient satisfaction, which limits their impact and underscores the need for validated measures of patient satisfaction. Post-operative satisfaction has been shown to be dependent on several factors. For example, Hamilton et al. concluded that patient satisfaction was dependent on meeting pre-operative expectations, pain relief, satisfaction with hospital experience, as well as pre-

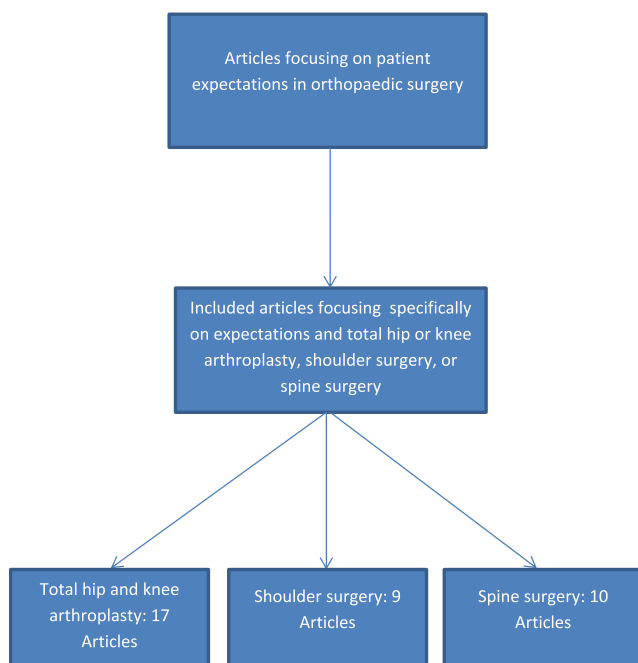


Fig. 1. Study outline.

Table 1
Selected studies focusing on patient expectations and outcomes.

Study	Expectation Measure	Factors associated with greater pre-operative expectations	Outcomes associated with greater pre-operative expectations
<i>Total Hip and Knee Arthroplasty</i>			
Judge et al. ⁷ (THA)	Short Survey/Questionnaire	Greater pre-operative expectations associated with younger age, female gender, increasing BMI, and more education	Improved WOMAC scores
Mancuso et al. ¹² (THA)	HSS Expectations Survey	Older age, male gender, and worse function	–
Hepinstall et al. ⁵ (TKA)	Short Survey/Questionnaire	Patient age, living situation, history of arthroplasty, and patient outcomes	–
Gandhi et al. ⁴ (THA and TKA)	Short Survey/Questionnaire	Younger age, male gender, and lower BMI	Improved pain
Koenen et al. ⁸ (THA and TKA)	Short Survey/Questionnaire	Female gender and history of arthroplasty	–
Mahomed et al. ⁹ (THA and TKA)	Short Survey/Questionnaire	None	Improved SF-36 physical function scores and pain relief
Cross et al. ² (THA and TKA)	HSS Expectations Survey	None	Improved function after TKA, less improvement in pain after THA
<i>Shoulder Surgery</i>			
Henn et al. ¹⁷ (TSA)	HSS Expectations Survey	Younger age	–
Oh et al. ¹⁸ (RCR)	Short Survey/Questionnaire	Being employed, receiving disease information from doctors, and poor functional status	Improved SST and Constant-Murley scores
Henn et al. ¹⁶ (RCR)	MODEMS	–	Improved SST, DASH, VAS, and SF-36 scores
Swarup et al. ³⁴ (TSA)	HSS Expectations Survey	–	Improved ASES, VAS, and SF-36 scores
<i>Spine Surgery</i>			
Mancuso et al. ²⁵ (Cervical)	HSS Expectations Survey	Younger age and more disability	–
Mancuso et al. ²⁶ (Lumbar)	HSS Expectations Survey	Younger age, history of chiropractic care, worse mental health scores, and more disability	–
Yee et al. ²⁴ (Lumbar)	Short Survey/Questionnaire	Higher SF-36 general health and physical component scores	Improved SF-36 role physical scores
Iversen et al. ¹⁹ (Lumbar)	Short Survey/Questionnaire	–	Improved function
Soroceanu et al. ²² (Cervical and Lumbar)	MODEMS	–	Improved function

operative and post-operative Oxford scores.³¹ Similarly, Noble et al. demonstrated that satisfaction after TKA was associated with age less than 60, meeting expectations, and absence of symptoms and functional impairment.³² While only a few studies in the literature have exclusively explored the relationship between pre-operative expectations and post-operative satisfaction, Mahomed et al. showed that the expectation of low complications predicted greater post-operative satisfaction after total hip and knee arthroplasty.⁹

3.2. Shoulder surgery

Pre-operative patient expectations have been studied in the setting of shoulder surgery, specifically rotator cuff repair (RCR)^{16,18} and total shoulder arthroplasty (TSA).¹⁷ Patient expectations have been assessed using custom surveys,¹⁸ as well as previously established questionnaires such as the Musculoskeletal Outcomes Data Evaluation and Management System questionnaire (MODEMS).¹⁶ In 2002, the Hospital for Special Surgery Shoulder Expectation Survey was developed and validated by Mancuso et al.³³ This survey is a 17-item questionnaire that requires less than 5 min to complete,³³ and it has been subsequently used to assess pre-operative patient expectations.¹⁷

In the literature, there have been several factors that have been correlated with patient expectations prior to shoulder surgery (Table 1). For example, Henn et al. showed that greater expectations prior to TSA were associated with younger age, worse general health as assessed by a visual analog scale (VAS), and worse American Shoulder and Elbow Surgeons scores (ASES).¹⁷ After controlling for other factors, they concluded that younger age was

the only independent predictor of greater expectations prior to TSA. Similarly, Oh et al. showed that occupation level, route of information about disease, and poor functional status were associated with greater expectations prior to RCR.¹⁸ More specifically, they found that patients that were employed and received information directly from doctors had a higher level of expectation prior to surgery.

Greater pre-operative patient expectations have been shown to be predictive of improved outcomes after RCR. For example, Henn et al. showed that greater pre-operative expectations correlated with better post-operative performance on the Simple Shoulder Test (SST); Disabilities of the Arm, Shoulder and Hand questionnaire (DASH); VAS for pain, shoulder function, and quality of life; and the SF-36.¹⁶ In the multivariate analysis, a higher level of expectations predicted greater improvement on the SST, DASH, VAS, and SF-36 at one year after surgery.¹⁶ Oh et al. confirmed these findings by showing that greater expectations predict significant functional improvement as measured by the SST and Constant-Murley score.¹⁸ In a recent study at our institution, we have also found a significant relationship between greater pre-operative expectations and better ASES, VAS, and SF-36 scores after primary TSA.³⁴

Limited research has focused on patient satisfaction after shoulder surgery. Previous studies have found that workers' compensation and age are correlated with post-operative patient satisfaction after RCR,³⁵ however, these findings have not been consistently verified by other studies.^{36,37} Tashjian et al. studied 112 patients who underwent a RCR using a satisfaction question and VAS for satisfaction.³⁸ They found that 95% of patients were satisfied with their outcome at a mean of 54 months after surgery, and

satisfaction was correlated with improvement in functional outcomes, general health status, and meeting pre-operative expectations. Furthermore, patients that were married, employed, and not disabled reported greater satisfaction after RCR.³⁸

3.3. Spine surgery

Various measures of patient expectations have been employed in spine surgery, including direct questions and brief questionnaires,^{20–24} the MODEMS questionnaire,²² and most recently, the Hospital for Special Surgery Cervical and Lumbar Spine Surgery Expectations Surveys.^{25,26} The HSS Spine Surgery Expectations Surveys offer a validated and reliable spine-specific measure of patient expectations.^{27,28} These surveys include 21 items, and they have been used to identify predictors of pre-operative expectations in spine surgery.^{25,26}

Several factors have been correlated with greater expectations in patients undergoing spine surgery. Mancuso et al. found that younger age and more pre-operative disability as measured by the Neck Disability Index (NDI) were consistently associated with greater expectations prior to cervical spine surgery.²⁵ Similarly, younger age, history of chiropractic care, worse mental health scores, and more disability as measured by the Oswestry Disability Index (ODI) were associated with greater expectations prior to lumbar spine surgery.²⁶ Furthermore, Yee et al. found that male gender, greater SF-36 General Health and lower SF-36 Physical Component scores correlated with greater expectations in patients undergoing posterior lumbar decompression.²⁴ Generally, younger age and greater disability seem to be associated with greater expectations prior to spine surgery (Table 1).

Pre-operative patient expectations have been associated with certain post-operative outcomes after spine surgery. For example, Yee et al. found that higher pre-operative expectations were associated with greater improvement in SF-36 Role Physical scores after surgery,²⁴ and Iversen et al. found that patients with many pre-operative expectations experienced greater functional improvement after surgery for lumbar spinal stenosis.¹⁹ Similarly, Soroceanu et al. found that higher pre-operative expectations on the MODEMS questionnaire was associated with improved functional outcomes after cervical and lumbar spine surgery.²²

The effect of pre-operative patient expectations on satisfaction after surgery has been specifically studied in the spine surgery literature. Toyone et al. reported that 86% of patients were satisfied two years after discectomy for lumbar disc herniation, and greater expectations were predictive of patient satisfaction with surgery.²³ Similarly, Lutz et al. showed that greater expectations were an independent predictor of improved satisfaction one year after lumbar discectomy.²¹ This effect was not seen in patients undergoing

laminotomy for lumbar spinal stenosis.²³ In comparison, Iversen et al. found that greater expectations regarding physical function predicted more satisfaction six months after surgery for lumbar spinal stenosis, while greater expectations regarding pain relief predicted less satisfaction after surgery.¹⁹ In a large, multi-center study, Soroceanu et al. found that greater pre-operative expectations were associated with decreased post-operative satisfaction after spine surgery; however greater fulfillment of pre-operative expectations was associated with higher post-operative satisfaction.²²

4. Discussion

Determining pre-operative patient expectations is an important aspect of elective orthopaedic surgery. Various methods have been described to assess patient expectations ranging from direct questioning to short surveys and questionnaires, however these methodologies have not been directly compared. A recent meta-analysis identified seven validated measure of patient expectations in orthopaedic surgery, five of which are specific to a particular procedure or joint, and only two are broadly applicable.²⁹ The majority of other expectations measures in the orthopaedic literature have not been validated, which significantly limits the interpretation and comparison of expectations research.²⁹ The Hospital for Special Surgery Expectation Surveys and MODEMS questionnaire are the most commonly used measure in the literature, and they offer a reliable and validated means to assess pre-operative patient expectations.²⁹ These tools can be used for various orthopaedic procedures, and they can be readily used in clinical practice and should be used for future expectations research. While this systematic review provides an overview of expectations research in orthopaedic surgery, a meta-analysis using standardized measures of expectations is needed to better understand the relationship between patient expectations, satisfaction, and outcomes.

Studies have found several factors as being associated with greater pre-operative expectations (Table 2). In total hip and knee arthroplasty, certain patient factors may be associated with pre-operative expectations; however, these factors have not been consistently verified in the literature, possibly due to variations in assessing patient expectations and defining levels of expectation. In shoulder surgery, young age has been shown to be predictive of greater pre-operative expectations in patients undergoing total shoulder arthroplasty,¹⁷ but poor pre-operative function may also be a significant predictor.^{17,18} Similarly, young age and greater disability have been correlated with greater expectations prior to spine surgery.^{24–26}

Several pre-operative patient expectations are integrally associated with patient outcomes after orthopaedic surgery. The

Table 2
Factors associated with greater pre-operative expectations.

Elective Orthopaedic Procedure	Patient Factors Associated with Greater Pre-operative Expectations
Total Hip and Knee Arthroplasty	Higher education level, worse pre-operative function, history of arthroplasty
Shoulder Surgery	Younger age, occupation, route of information about disease, worse functional status
Spine Surgery	Younger age, greater disability, male gender

Table 3
Factors associated with post-operative satisfaction.

Elective Orthopaedic Procedure	Patient Factors Associated with Post-operative Satisfaction
Total Hip and Knee Arthroplasty	Meeting pre-operative expectations, improvement in symptoms, functional improvement, expectation of fewer complications
Shoulder Surgery	Meeting pre-operative expectations, functional improvement, improved general health status, being married, and being employed
Spine Surgery	Meeting pre-operative expectations.

literature shows that overall patient expectations as well as specific patient expectations regarding pain relief predict better functional and pain outcomes approximately six months to one year after total hip and knee arthroplasty.^{2,4,7,9} Similarly, greater pre-operative expectations predicted greater improvement on objective and subjective measures of function and pain after RCR and TSA.^{16,34} Furthermore, greater pre-operative expectations were associated with improved functional outcomes after cervical and lumbar spine surgery.²² As a whole, similar to other disciplines in medicine, greater pre-operative patient expectations are predictive of improved functional outcomes and pain relief after elective orthopaedic procedures.¹

There are very few validated measures of patient satisfaction after orthopaedic surgery. In total hip and knee arthroplasty, RCR, and spine surgery, several patient factors as well as meeting pre-operative expectations are significant predictors of post-operative satisfaction (Table 3). There have been reports of greater expectations being correlated with increased satisfaction after surgery; however, there have been no consistent findings in the literature. Nevertheless, defining and meeting pre-operative expectations is extremely important in ensuring patient satisfaction after elective orthopaedic surgery. The importance of understanding patient satisfaction was emphasized in a recent review by Graham et al.³⁹ Similar to their conclusions, our findings show that a greater emphasis needs to be placed on developing measures of patient satisfaction and understanding its relationship with expectations.

Since pre-operative patient expectations are associated with patient outcomes and satisfaction after surgery, it is important to consider ways to modulate expectations to improve post-surgical outcomes and satisfaction. There have been a handful of studies addressing this topic. For example, Mancuso et al. conducted a randomized controlled trial to determine whether pre-operative educational classes could modify patient expectations in total hip and knee arthroplasty patients.⁴⁰ They found that these classes could effectively modify patient expectations, which suggests that patient outcomes and satisfaction can be modified and potentially improved as well. Similarly, a prospective study by Thomas et al. showed that an interdisciplinary teaching intervention provided a better understanding of expectations after surgery,⁴¹ suggesting that patients can be taught about what to expect after surgery. Since it is possible to modify pre-operative patient expectations, a prospective study is needed to determine the effects of interventions on post-operative outcomes and satisfaction.

Our study has several strengths. For instance, it is the first systematic review to the best of our knowledge that focuses on pre-operative patient expectations in orthopaedic surgery. Similarly, this review provides a comprehensive overview of literature on patient expectations relating to three common subspecialty areas in orthopaedic surgery. On the other hand, our review has certain limitations as well. For example, we did not provide quantitative data to describe the strength of the reported associations. However, the purpose of our study was to describe the qualitative role of pre-operative expectations. Furthermore, we did not perform an analysis of the quality of the studies. Additional studies are needed to quantify the relationship between pre-operative patient expectations and outcomes/satisfaction after surgery, and this study provides a framework for designing high-quality future studies on this topic.

In conclusion, pre-operative patient expectations are associated with certain patient factors, and they are independently associated with post-operative outcomes in elective orthopaedic surgery. Furthermore, meeting pre-operative expectations is associated with greater patient satisfaction after surgery. A discussion of patient goals and setting appropriate expectations is necessary in every pre-operative patient encounter, and understanding patient

expectations is immensely important in predicting outcomes and satisfaction after elective orthopaedic surgery. Further study is needed to determine the optimal method to assess expectations and satisfaction, and to determine the effectiveness of strategies to modify expectations and improve satisfaction.

Conflicts of interest

None of the authors have any relevant conflicts of interest related to this work. No funding was received for this work.

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