

Pain, Functional Scores, and Radiographic Severity of Illness Influence the Perception of Time Spent With the Physician by Patients Presenting for Initial Evaluation of Knee Osteoarthritis

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Background: Patient satisfaction has become a significant factor in reimbursement schedules for physicians. A matter of debate is whether the patient's perception of time spent with the physician improves patient satisfaction. We sought to determine whether patient-physician time correlates with patient satisfaction and which factors are associated with patient perception of time.

Methods: A total of 73 patients who presented for an initial evaluation of knee osteoarthritis were evaluated by the same orthopedic surgeon at an outpatient clinic in New Orleans, LA. Each encounter was timed with a stopwatch. After the physician encounter, patients were asked to fill out a questionnaire assessing their perception of time spent with the physician, subjective pain, satisfaction with the visit, and understanding of the diagnosis and treatment plan. Patients were also asked to complete 4 functionality surveys. Radiographs of the patients' knees were taken and quantified using Kellgren-Lawrence and Ahlbäck grading scales.

Results: We noted no relationship between patient satisfaction and patients' perception of time spent with the physician. Patients perceived their time with the physician to be an average of 6.5 minutes more than the actual time. However, patients who reported higher subjective pain scores (>7 on a 10-point scale) misestimated their time with the physician by nearly 96%, while patients with lower subjective pain scores (<7 on a 10-point scale) misestimated their time with the physician by only 54% ($P<0.007$). We discovered similar findings in patients with worse Kellgren-Lawrence radiographic scores as well as worse Oxford Knee Scores and Knee injury and Osteoarthritis Outcome Scores. The actual time spent was not different among patients.

Conclusion: Patients with greater subjective pain and worse functional status and patients with worse radiographic severity of knee osteoarthritis perceived greater time spent with the physician. However, no relationship between these variables and patient satisfaction scores was seen.

Keywords: *Communication, insurance–health, insurance–health–reimbursement, osteoarthritis–knee, Patient Protection and Affordable Care Act, patient satisfaction*

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INTRODUCTION

Since the passage of the Patient Protection and Affordable Care Act of 2010, patient satisfaction has become an element of physician reimbursement, factoring into final payment calculations for services provided. Depending on the context in which care is delivered and the expectations of patients in those contexts, patient satisfaction is associated with several modifiable as well as nonmodifiable factors. For example, nonmodifiable factors associated with

lower patient satisfaction scores among orthopedic trauma patients are age <65 years,¹ an injury not requiring surgery,¹ and a low level of involvement in the patient's own care.² A modifiable factor associated with higher patient satisfaction scores for patients with orthopedic trauma is adequate pain management.³ In the outpatient setting, patients evaluating their care are reported to be more satisfied when their expectations of treatment or outcome are maintained,⁴ although younger patients (18-29

Patient ID #:

1. How much time did the doctor spend with you? _____(minutes)

2. How much pain are you in?

No Pain				Moderate Pain					Severe Pain
1	2	3	4	5	6	7	8	9	10

3. How satisfied are you with the doctor's visit?

Very Unsatisfied		Neutral		Very Satisfied
1	2	3	4	5

4. How well do you understand your diagnosis and treatment plan?

Not at all				Completely Understand
1	2	3	4	5

5. What are your concerns about your diagnosis or doctor's visit?

Figure 1. Patient questionnaire.

years) who live within a 50-mile radius of the clinic have been reported to be less satisfied with their care than patients who travel a longer distance and are >80 years of age.⁵

Because the majority of patients who present for evaluation of knee osteoarthritis do so in the outpatient setting, understanding factors that contribute to patient satisfaction and being able to reliably measure it as early as the initial outpatient meeting can be valuable to orthopedic surgeons. In the ambulatory setting, factors shown to influence patient satisfaction include expectations of care,⁴ ease of scheduling appointments,⁶ and perception of physician empathy.⁷

Interestingly, results are mixed regarding whether patient perception of time spent with the physician is a significant factor in patient satisfaction. Long and colleagues found that Press Ganey scores were strongly associated with patient perception of time spent with the physician in a group of patients who presented to an ophthalmology clinic,⁶ whereas Parrish and colleagues arrived at the opposite

conclusion for patients who had hand surgery,⁸ echoing the results obtained by Teunis and colleagues in a similar population.⁹

We evaluated whether patient perception of time spent with the physician correlates with patient satisfaction, how accurately patients perceive time spent, and which patient factors correlate with the perception of greater time spent with the physician. We hypothesized that patients who perceived greater time spent with the physician would have higher satisfaction scores and that patients would be accurate judges of time within 5 minutes.

METHODS

We conducted a prospective observational study at an outpatient orthopedic clinic in New Orleans, LA. Patients were seen by the same physician throughout the study to maintain consistent physician-patient dyads. English-speaking patients who presented to the clinic with symptoms related to knee osteoarthritis between August 1, 2012, and May 31, 2014, were eligible to participate in the study.

Table 1. Comparison of Perceived Time, Actual Time, and Percentage Error With Patient Satisfaction

Variable	Groups	P Value
Perceived time	Satisfaction 5 of 5 (n=58)	0.270
	Satisfaction <5 (n=15)	
Actual time	Satisfaction 5 of 5 (n=58)	0.299
	Satisfaction <5 (n=15)	
Percentage error	Satisfaction 5 of 5 (n=58)	0.556
	Satisfaction <5 (n=15)	

During each patient visit, the physician used a stopwatch to time the encounter, including assessment, diagnosis, and discussion of treatment options. At the end of the encounter, before any treatments were administered (eg, intraarticular corticosteroid injection), the physician gave the patient a questionnaire and 4 surveys to complete and left the room, at which point the patient completed the questionnaire and surveys. When the physician left the room, the watch was stopped, and the actual time was recorded. Other data collected were patient age, sex, level of education, insurance type, and x-ray grades. Radiographs of each patient's knees were performed at the time of the visit to assess the severity of osteoarthritis. The time of radiographic collection was not included in actual time measurements. Radiographic osteoarthritis of the knee was classified using the Kellgren-Lawrence and Ahlback grading systems.

Patients completed a questionnaire that assessed estimated time of patient-physician interaction in minutes, subjective pain intensity on a numerical rating scale from 1-10 (with higher numbers indicating greater pain), satisfaction with the visit on a 1-5 Likert scale (with higher numbers indicating greater satisfaction), and understanding of their diagnosis and treatment plan on a 1-5 Likert scale (with higher numbers indicating better understanding) (Figure 1). Patients also completed 4 surveys assessing pain, function, and health status—Oxford Knee Score (OKS), Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC), Knee injury and Osteoarthritis Outcome Score (KOOS), and the 12-item Short Form Health Survey (SF-12). The questions on all 4 surveys have a 5-point response scale. In all surveys, higher scores denote better functioning.

Regression analysis and *t* tests were performed to determine the relationship between patient variables and perceived time with the physician. Two-tailed heteroscedastic Welch *t* tests were performed to compare sets of data. Statistical significance was defined as $P \leq 0.05$. A moderate correlation was designated as a Pearson R^2 value > 0.1 .

RESULTS

A total of 141 patients consented to participate in the study, of whom 68 were excluded from analysis because of incomplete surveys or incorrect recording of the patient

Table 2. Pearson R^2 Coefficients Between Perceived Time, Actual Time, and Percentage Error With Patient Satisfaction Continuously

Variable	R^2	P Value
Satisfaction		
Perceived time	0.009	0.243
Actual time	0.018	0.199
Percentage error	0.001	0.554

encounter time. The responses and medical records of 73 patients (21 males, 52 females) with a mean age of 53 years (range, 17-88 years) were evaluated. Of these 73 patients, 58 rated their satisfaction as 5 out of 5, 9 rated their satisfaction as 4 out of 5, and 6 rated their satisfaction as ≤ 3 (mean score 1.16). The average time spent was 10.7 minutes, and average perceived time was 17.2 minutes.

In a categorical analysis, patient satisfaction had no correlation with perceived time spent with the physician, the actual time spent, or the percentage error of estimated length of time (Table 1). Pearson R^2 coefficients of patient variables also showed no relationship with patient satisfaction on a continuum (Table 2). Level of education and insurance type were not found to correlate to perception of time or subjective pain ($P > 0.05$).

On average, patients perceived time spent with the physician as 61% longer than the actual time spent with the physician, or on average 6.5 minutes longer than the actual time. With respect to age, severity of diagnosis as assessed by radiographs, subjective pain, and functional scales, we observed no correlation between the variables and actual time spent with each patient (Table 3). Among patient variables, we found a moderate correlation between higher Kellgren-Lawrence x-ray scores, subjective pain scores, OKS, and KOOS and patients' inaccuracy in judging the length of the visit (Table 4). The results are illustrated in Figures 2-5, respectively. We observed a significant difference when these same variables—Kellgren-Lawrence x-ray scores, subjective pain scores, OKS, and KOOS—were examined categorically (Table 5). Notably, patients who rated their pain as 7 out of 10 or greater tended to

Table 3. Pearson R^2 Coefficients Between Actual Time Spent With the Physician and Select Patient Variables

Variable	R^2	P Value
Actual Time		
Kellgren-Lawrence grade	0.018	0.164
Ahlback grade	0.032	0.174
Subjective pain	0.001	0.661
Age	0.028	0.334
OKS	0.014	0.800
WOMAC	0.024	0.693
KOOS	0.011	0.355
SF-12	0.001	0.459

KOOS, Knee Injury and Osteoarthritis Outcome Score; OKS, Oxford Knee Score; SF-12, 12-Item Short Form Health Survey; WOMAC, Western Ontario and McMaster Universities Osteoarthritis Index.

Table 4. Pearson R² Coefficients Between Patient Variables and Patient Percent Error in Estimating Length of Time With the Physician

Variable	R ²	P Value
Patient percent error estimating time with the physician		
Kellgren-Lawrence grade	0.117	0.022
Ahlbäck grade	0.080	0.027
Subjective pain	0.137	0.172
Age	0.036	0.557
OKS	0.124	0.008
WOMAC	0.057	0.143
KOOS	0.125	0.075
SF-12	0.064	0.172

KOOS, Knee Injury and Osteoarthritis Outcome Score; OKS, Oxford Knee Score; SF-12, 12-Item Short Form Health Survey; WOMAC, Western Ontario and McMaster Universities Osteoarthritis Index.

misjudge the length of the encounter by 95.6%, while patients who rated their subjective pain below 7 out of 10 only had an error rate of 54.2% ($P < 0.007$). While a small number of patients underestimated the length of the encounter, this was accounted for in the final calculations, and the results shown are the average of positive and negative percent error. All total percentage error rates recorded were overestimations of the actual time spent.

DISCUSSION

Patients on average perceived their time with the physician to be 6.5 minutes greater than it actually was, an overestimation of 61% that varied moderately with different patient variables, including subjective pain, radiographic knee severity, OKS, and KOOS. Despite finding no relationship between patient perception of time and patient

satisfaction, the results represent an important understanding of how patients perceive their overall ambulatory experience and may also provide a new understanding of how patients perceive time, depending on pain and functional status. In a study examining the perception of time in the setting of pain, participants subjected to an experimental model of pain underestimated the amount of time elapsed during the study but experienced the time as longer-lasting.¹⁰ Understanding how time is perceived in the setting of pain may explain why patients with >7 out of 10 subjective pain levels misjudged the length of their encounter by 95.6%, while those with lower pain levels misjudged the length of their encounter by only 54.2%. Further studies are merited in this respect.

In a 2016 study, Parrish and colleagues studied a cohort of 112 new patients who presented to a hand surgery clinic and found that patient perception of time spent with the physician had little impact on overall satisfaction with the visit. Interestingly, previsit expectations of length of time and perception of surgeon rush did not factor into patient satisfaction.⁸ In a related study, Menendez and colleagues discovered that patient perception of surgeon empathy was the primary driver of satisfaction in the ambulatory setting.⁷ In a similar population of 81 hand surgery patients, Teunis and colleagues found that actual time spent had no effect on patient satisfaction.⁹ Shorter patient waiting time and being married or in a relationship were the strongest predictors of patient satisfaction. The authors concluded with a recommendation to enhance the quality, not the quantity, of time spent with the patient.

Patient expectations of the visit in the various populations studied may play a role in the differences in conclusions found in the literature regarding the relationship between patient satisfaction and time spent with the physician. Because they are presenting to a surgeon's clinic, patients may expect a surgical solution to their concern. Thus, the shorter the visit and the quicker the conclusion is reached that surgery is needed, the more satisfied patients might be. In a population of patients presenting to an ophthalmology clinic, the perception of time spent with the physician and

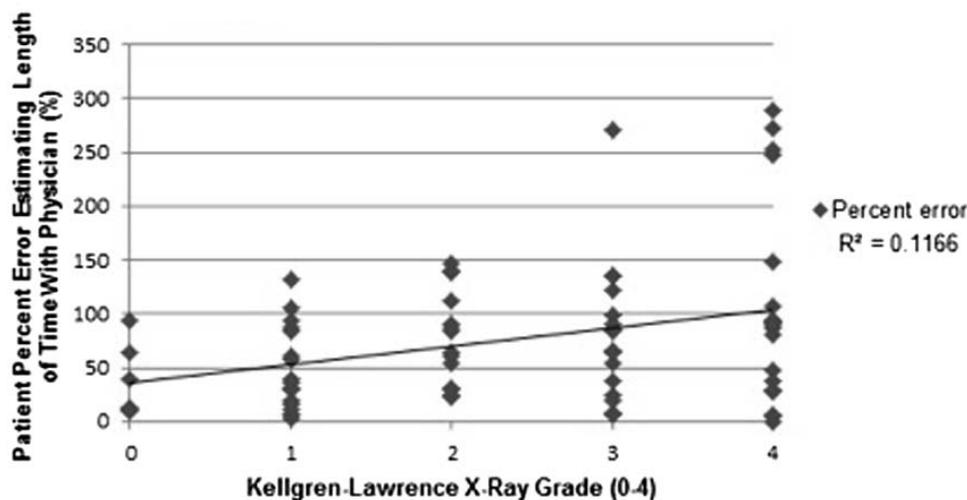


Figure 2. Kellgren-Lawrence x-ray grade and patient percent error estimating length of time with the physician. The R² value associated with this relationship was 0.1166.

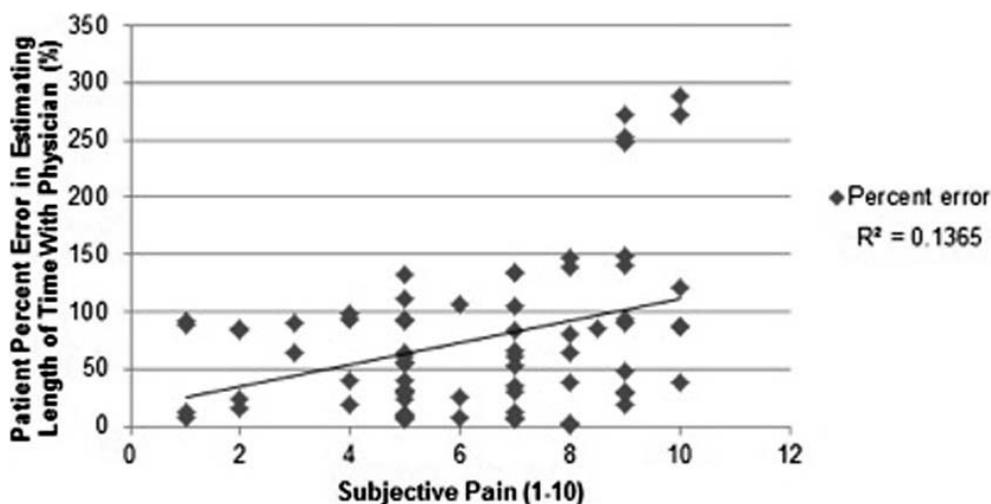


Figure 3. Subjective pain scores and patient percent error in estimating length of time with the physician. The R^2 value associated with this relationship was 0.1365.

the ease of scheduling appointments were the factors most highly associated with patient satisfaction.⁶ Interestingly, perceived physician friendliness did not have as robust an impact. Similarly, in a chronic pain clinic, a survey-based study of 600 patients during a 5-year period found that perceived thoroughness, perceived listening, and perceived time spent played the greatest roles in patient care rated “very good” or “excellent.”¹¹ In a 2001 study, Lin and colleagues examined patients in an ambulatory internal medicine clinic and found that perception of time spent was a determinant of patient satisfaction.¹² The group also discovered that when expectations of time spent were met or exceeded, patients were more satisfied with their care. A 2016 survey of female veterans found that perception of time spent with the primary physician was the main driver in patient satisfaction.¹³ A possible explanation for the differences in satisfaction in outpatient settings may be the nature of the care patients expect from different physicians, with differences primarily being medical vs surgical solu-

tions to patients’ problems. Furthermore, surgery clinic patients are likely referred, so much of the history and physical information is already available to surgeons, allowing them to spend more time discussing treatment options.

We discovered a relationship between the ability of patients to estimate the length of time of an encounter and the radiographic severity of their knee osteoarthritis. Furthermore, we found that the worse patients rated their pain, the more inaccurately they estimated the length of time spent with the physician. Similar correlations were noted with the OKS and KOOS, measurements of daily functioning. To our knowledge, we are the first to identify this relationship. One potential explanation is that patients with greater pain simply perceive time differently. A more pragmatic explanation, however, is that patients in worse pain with worse radiographic scores might present at a surgeon’s clinic with a more palpable expectation of knee arthroplasty than healthier patients, and the matching of this

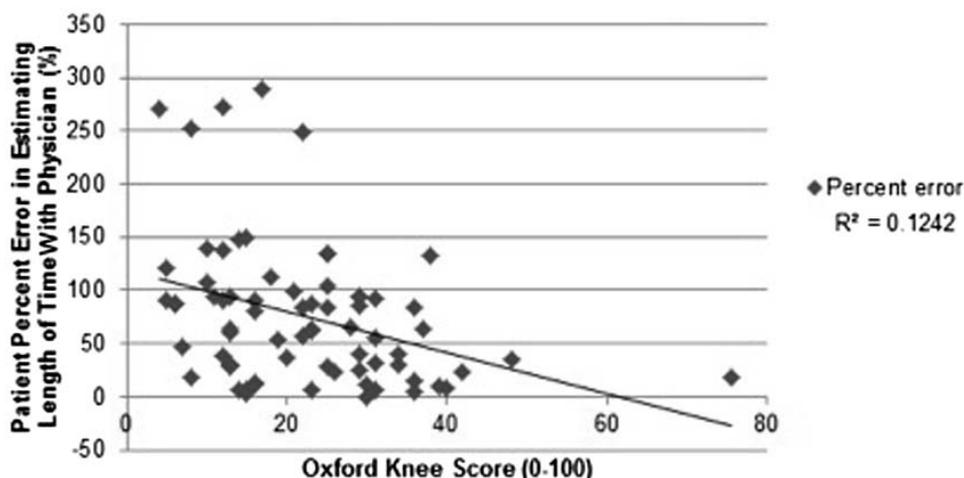


Figure 4. Oxford Knee Scores and patient percent error in estimating length of time with the physician. The R^2 value associated with this relationship was 0.1242.

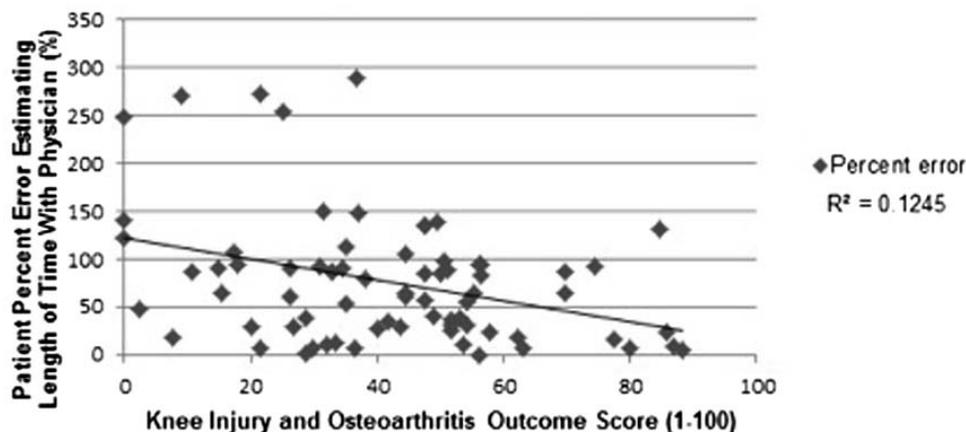


Figure 5. Knee injury and Osteoarthritis Outcome Score and patient percent error estimating length of time with the physician. The R² value associated with this relationship was 0.1245.

expectation likely increases their satisfaction and may ultimately alter their sense of time spent. More studies examining the eventual treatment plan (reassurance, medical treatment, and surgical treatment) may bear out differences in patient perception of time spent with the physician.

Despite its novel findings, our study is limited by a number of factors, notably a smaller-than-expected data set size, a lopsided male-to-female ratio, and a coarse satisfaction scale that may have contributed to the large skew of data toward maximal satisfaction. Although patients in the ambulatory setting present with few acute problems and a lesser degree of distress than in the inpatient setting, and ambulatory patients are typically more satisfied than patients in the inpatient setting, the positive skew of patient satisfaction suggests that satisfaction was not adequately measured. Using a 1-10 scale instead of a 1-5 Likert scale might have uncovered more heterogeneity in the data.

We chose data from the same physician to maintain constant physician-patient dyads, but data from one physician may not accurately reflect the range of orthopedic surgeon-patient relationships. Thus, the external validity of the study is limited, and future investigations may benefit from expanding the number of physicians involved. Addi-

tionally, patients were asked to evaluate their satisfaction immediately following the physician meeting, and the immediacy of the evaluation may have artificially boosted satisfaction scores because patients may not have had enough time to reflect on the encounter. Largely because of incomplete surveys, 48% of the study population was ineligible for inclusion, a situation that can likely be ameliorated by limiting the number of assessments for patients to complete or by simplifying survey language. Asking the patients to complete the satisfaction scale before they leave the office may provide a more accurate assessment of satisfaction.

CONCLUSION

While some studies have suggested that perceived time spent with the physician plays an important role in patient satisfaction, we found no such relationship because most patients were fully satisfied with their visit. We also found that worse subjective pain, Kellgren-Lawrence scores, and OKS and KOOS scores were associated with patients' percentage of error estimating time with the physician. Despite the findings, a closer examination of the population studied and larger study efforts with more than one

Table 5. Comparison of Select Patient Variables With Patient Percent Error in Estimating Length of Time With the Physician

Variable	Groups	Mean Percent Error, %	P Value
Kellgren-Lawrence grade	Score 0-2 (n=37)	+57.7	0.017
	Score 3-4 (n=36)	+94.4	
Subjective pain	Score ≤6 (n=35)	+54.2	0.007
	Score ≥7 (n=38)	+95.6	
OKS	Score >20 (n=38)	+60.1	0.035
	Score ≤20 (n=35)	92.8	
KOOS	Score >45 (n=36)	+59.1	0.034
	Score ≤45 (n=37)	+92.0	

For the Kellgren-Lawrence grade and subjective pain scores, a lower score indicates better functioning. For the OKS and KOOS, a higher score indicates better functioning.

KOOS, Knee injury and Osteoarthritis Outcome Score; OKS, Oxford Knee Score.

physician are necessary to fully elucidate the effects of perceived time on patient satisfaction.

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