The effect of preoperative expectations and postoperative fulfillment of expectations on dissatisfaction after spine surgery for patients with good clinical outcomes

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Patient Satisfaction

- Increasingly important metric to evaluate surgery success
- Subjective measure influenced by:
  - Clinical improvement in pain and disability
  - Psychosocial characteristics
  - Ability to return to work and other activities
  - Other factors not directly related to the episode of care (i.e. staff characteristics, wait times, and even parking availability)
- Most patients (53%-90%) report being satisfied after spine surgery

Although most patients with a good clinical outcome report being satisfied, there remains an important sub-population of patients who have clinically meaningful improvement but report being dissatisfied with surgery

Patient Expectations

- Major determinant in the decision to undergo surgery: prediction of future condition may affect treatment choices and perceptions of postoperative outcomes
- Most patients have high expectations for reduction in pain and disability
- There is conflicting evidence regarding the relationship between preoperative expectations and postoperative outcomes in the literature
- Dissatisfaction may be attenuated by improved preoperative communication and effectively establishing reasonable postoperative expectations

Objective

Why do patients who achieved clinical improvement in disability or pain still report dissatisfaction at 12-months after elective spine surgery?

Specifically, when patients achieved clinical improvement, what is the role of preoperative expectations and fulfilled expectations on dissatisfaction 12-month after surgery?

Population & Sample

- Patients undergoing elective spine surgery for degenerative reasons at VUMC were enrolled in a spine outcomes registry
- Exclusions: incarcerated or having surgery for tumor, traumatic dislocation, or spinal infection
- Sample (N=540):
  - 30% decrease from baseline to follow-up in disability or pain (axial/extremity)
  - 12-month satisfaction score
  - Expectations survey completed at preop and 3-months postop

Demographics

	Lumbar (N=306)	Cervical (N=234)
Patient Demographics		
Age	60 ± 13	57 ± 11
Body Mass Index	31 ± 6	30 ± 6
Female	50%	45%
Race		
White	89%	86%
Non-White	11%	14%
Private insurance	48%	48%
Liability or disability claim	6%	13%
Education		
High School or Less	40%	38%
Some College or More	60%	62%
Currently working	37%	45%
Current smoker	11%	16%

	Lumbar	Cervical
Clinical and Surgical Characteristics		
Comorbidity, Elixhauser	-2.8 [-14, 19]	-2.3 [-14, 21]
Preop chronic opioid use	12%	17%
Revision surgery	23%	21%
Myelopathy	--	36%
Motor deficits	24%	44%
Procedure		
ACDF	--	66%
Cervical posterior	--	34%
Lumbar fusion	62%	--
Lumbar non-fusion	38%	--
Preop patient Reported Measures		
Disability, ODI/NDI	49 ± 15	44 ± 15
Axial Pain Intensity, NRS	6.5 ± 2.4	5.8 ± 2.7
Extremity Pain Intensity, NRS	6.9 ± 2.2	5.6 ± 2.8
PROMIS Physical Function	33 ± 6	39 ± 7
PROMIS Depression	52 ± 10	51 ± 9

Values are percents, mean ± SD or median [IQR]

Exposure & Outcome

Outcome:

NASS Satisfaction Item
(Collected 12 month after surgery)

- Collected 12-months after surgery
- Response options (higher=more dissatisfied)
  1. The treatment met my expectations
  2. I did not improve as much as I had hoped, but I would undergo the same treatment for the same outcome
  3. I did not improve as much as I had hoped, and I would not undergo the same treatment for the same outcome
  4. I am the same or worse than before treatment

Exposure:

HSS Cervical and Lumbar Spine Surgery Expectations Survey

- Expectations for surgery collected preoperatively
- Fulfilment of expectations collected after surgery
- Total score computed: higher score= higher expectations for good outcome (at preop); more expectations fulfilled (at 3mo postop)
- 20-item survey measures patient's expectations:
  - Pain
  - Personal daily activities
  - Psychosocial issues
  - Physical function
  - Skeletal function

Hospital For Special Surgery Lumbar Spine Surgery Expectations Survey

Please circle the number that best describes your response to each question.

How much improvement do you expect in the following areas as a result of your spine surgery?

	Back to normal or complete improvement	Not back to normal, but…			I do not have this expectation, or this expectation does not apply to me
		A lot of improve-ment	A moderate amount of improvement	A little improve-ment	
Relieve neck pain	4	3	2	1	0
Relieve shoulder, arm or hand pain	4	3	2	1	0
Relieve symptoms that interfere with sleep	4	3	2	1	0
Improve strength in arms and hands	4	3	2	1	0
Relieve numbness in arms and hands	4	3	2	1	0
Improve ability to use hands for fine activities (such as, button a shirt, write)	4	3	2	1	0
Improve balance	4	3	2	1	0
Improve ability to position head to read	4	3	2	1	0
Improve ability to manage personal care (such as, comb hair, brush teeth, shave)	4	3	2	1	0
Improve ability to drive	4	3	2	1	0
Remove need for pain medications	4	3	2	1	0
Improve ability to interact with others (such as, social and family activities)	4	3	2	1	0
Improve sexual activity	4	3	2	1	0
Improve ability to perform daily activities (such as, chores, shopping, errands)	4	3	2	1	0
Improve ability to exercise for general health	4	3	2	1	0
Improve ability to participate in sports	4	3	2	1	0
If currently employed: Fulfill job responsibilities (such as, work required hours, complete expected tasks)	4	3	2	1	0
If currently work-disabled or unemployed due to spine: Go back to work for salaried employment	4	3	2	1	0
Reduce emotional stress or sad feelings	4	3	2	1	0
Stop my spine condition from getting worse	4	3	2	1	0
Remove the control the spine condition has on my life	4	3	2	1	0

Covariates

Patient Demographics	Clinical & Surgery Data	PROMIS Depression	Disability (ODI/NDI)	NRS Pain Scale
• Sex • Age • Race • Education • Employment • Insurance • BMI • Current smoker • Preop opioid use	• Elixhauser comorbidity index • ambulation • motor deficit • surgical approach	• 4-item short form • T-score computed and used in analysis	•Oswestry Disability Index (ODI) for lumbar •Neck Disability Index (NDI) for cervical	• Axial pain (back for lumbar/neck for cervical) • Extremity pain (leg for lumbar/arm for cervical)

Ordinal Logistic Regressions

Outcome:	Dissatisfaction at 12-mo		
Model:	Model 1	Model 2	Model 3
Primary Exposure:	Preop expectations (curvilinear)	Expectations fulfilled at 3-months postop	Preop expectations (curvilinear)
			Expectations fulfilled at 3-months postop
Covariates:	Preoperative disability & pain	Preop to 3mo change in disability & pain	Preop to 3mo change in disability & pain
	Preoperative depression		
	Patient demographics		
	Clinical & surgery data		

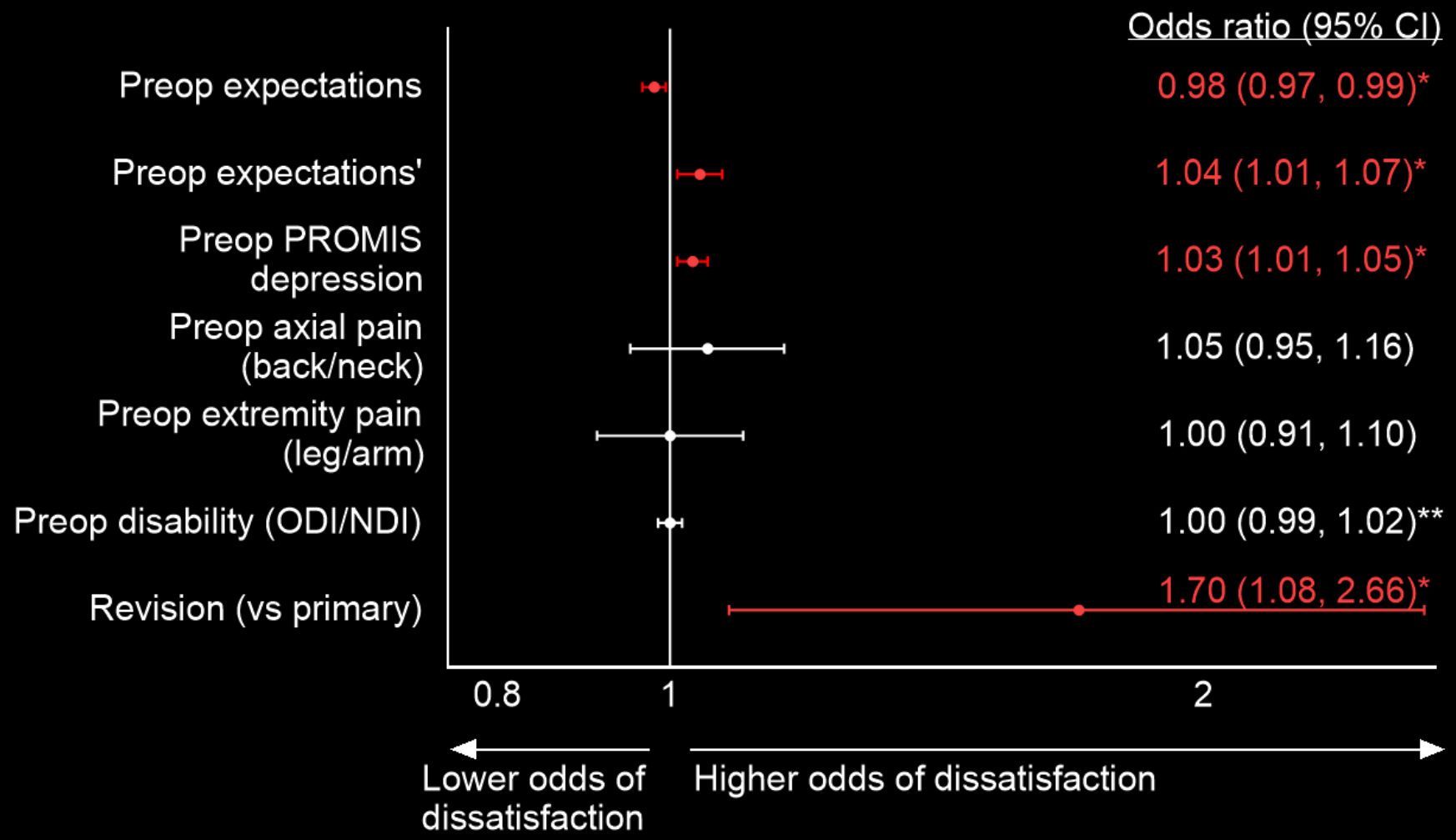
Results

- Of patients who had a 30% improvement from baseline in disability or pain, 33% of patients reported being unsatisfied with their spine surgery and 67% reported being satisfied (“Treatment met my expectations”)

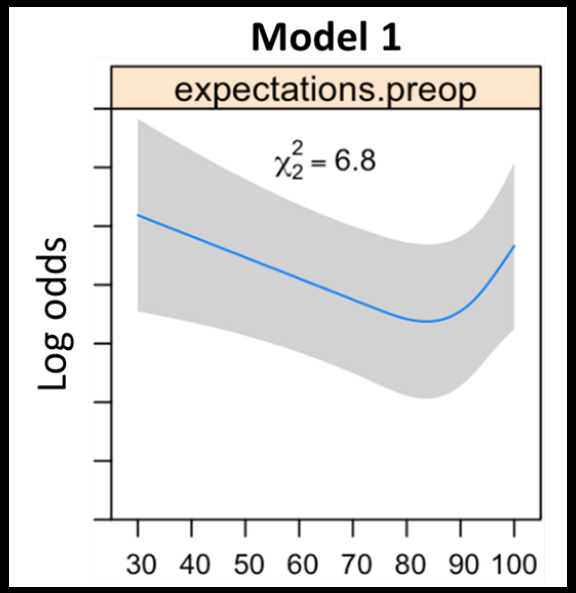
- In this sample of those with a “good clinical outcome”:
  - Preoperative expectations: M = 75, SD = 19
  - Expectations fulfilled at 3mo: M = 80, SD = 36

- Preop PROMIS depression was a significant predictor of dissatisfaction among those with a “good outcome” across all three models

Model 1: Preoperative Expectations (R^2=0.13)



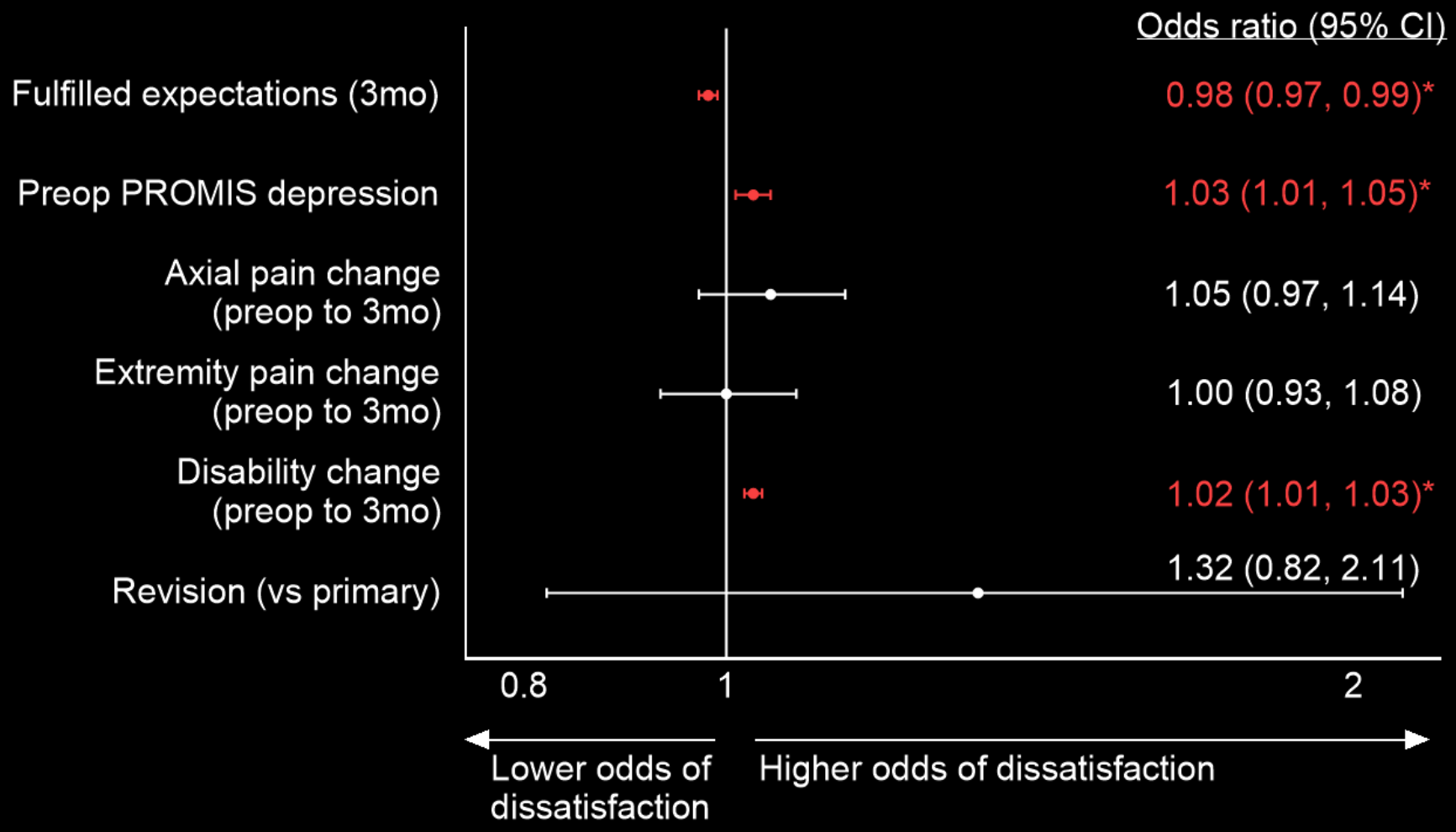
Ordinal logistic regression revealed that preoperative expectations was a significant predictor of dissatisfaction while controlling for covariates.

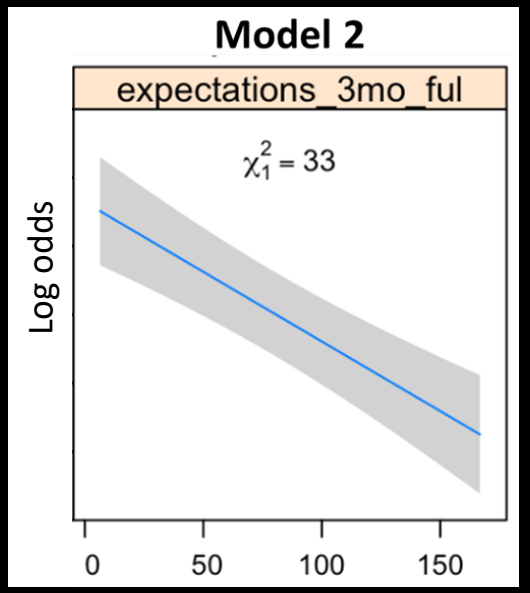


Expectations had a significant nonlinear relationship with dissatisfaction. The relationship between patient expectations and dissatisfaction was negative, but inverted around 80, with higher preoperative expectations being associated with higher odds of dissatisfaction.

Covs: sex, age, race, education, Elixhauser comorbidity index, employment, insurance, ambulation, motor deficits, BMI, current smoker, preop opioid use, approach

Model 2: Fulfilled Expectations at 3mo (R^2=0.26)



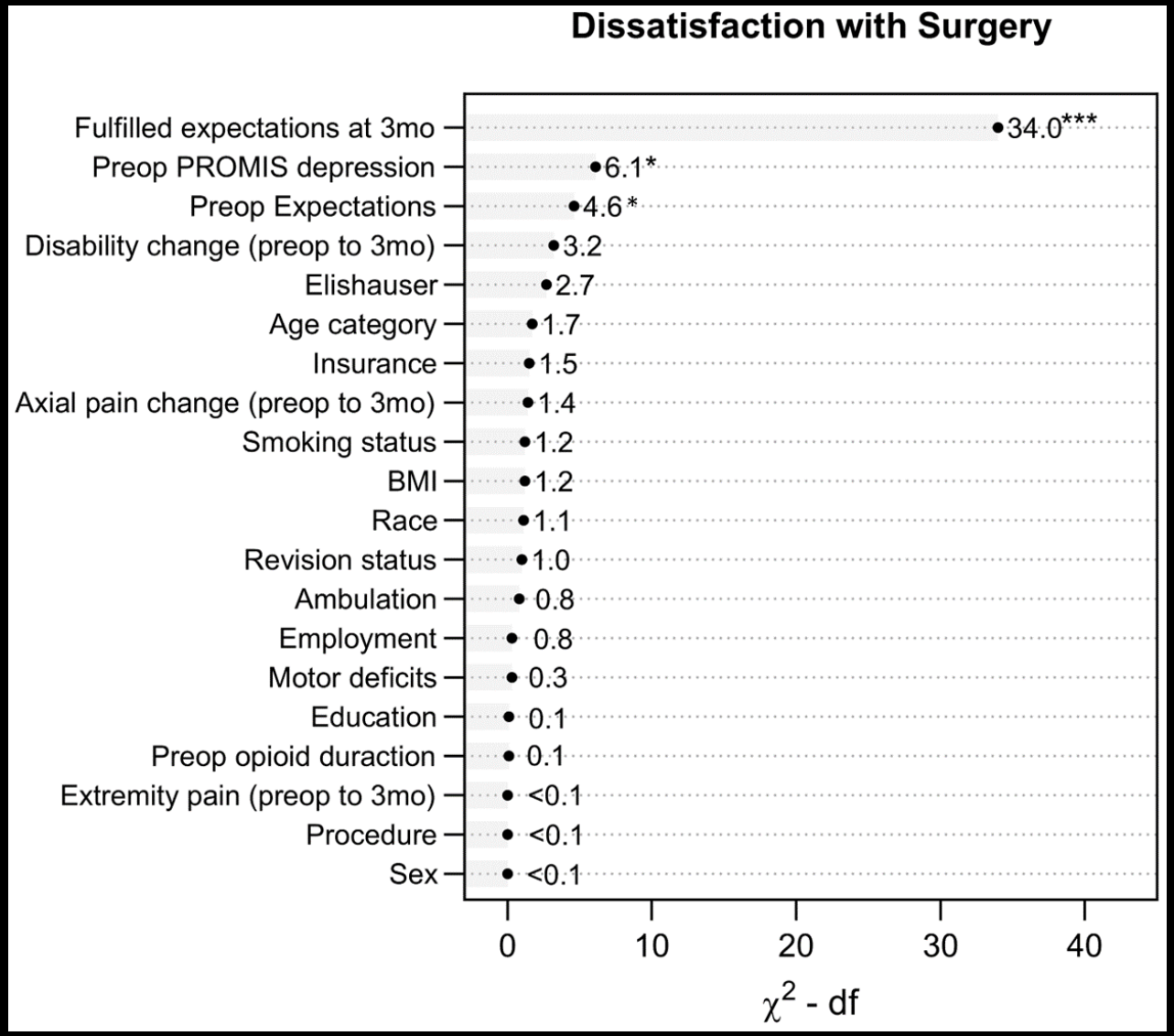


Expectations fulfilled was the strongest predictor of dissatisfaction in model 2. Higher expectations fulfilled was associated with less dissatisfaction.

Ordinal logistic regression revealed that postoperative expectations fulfilled was a significant predictor of dissatisfaction while controlling for covariates.

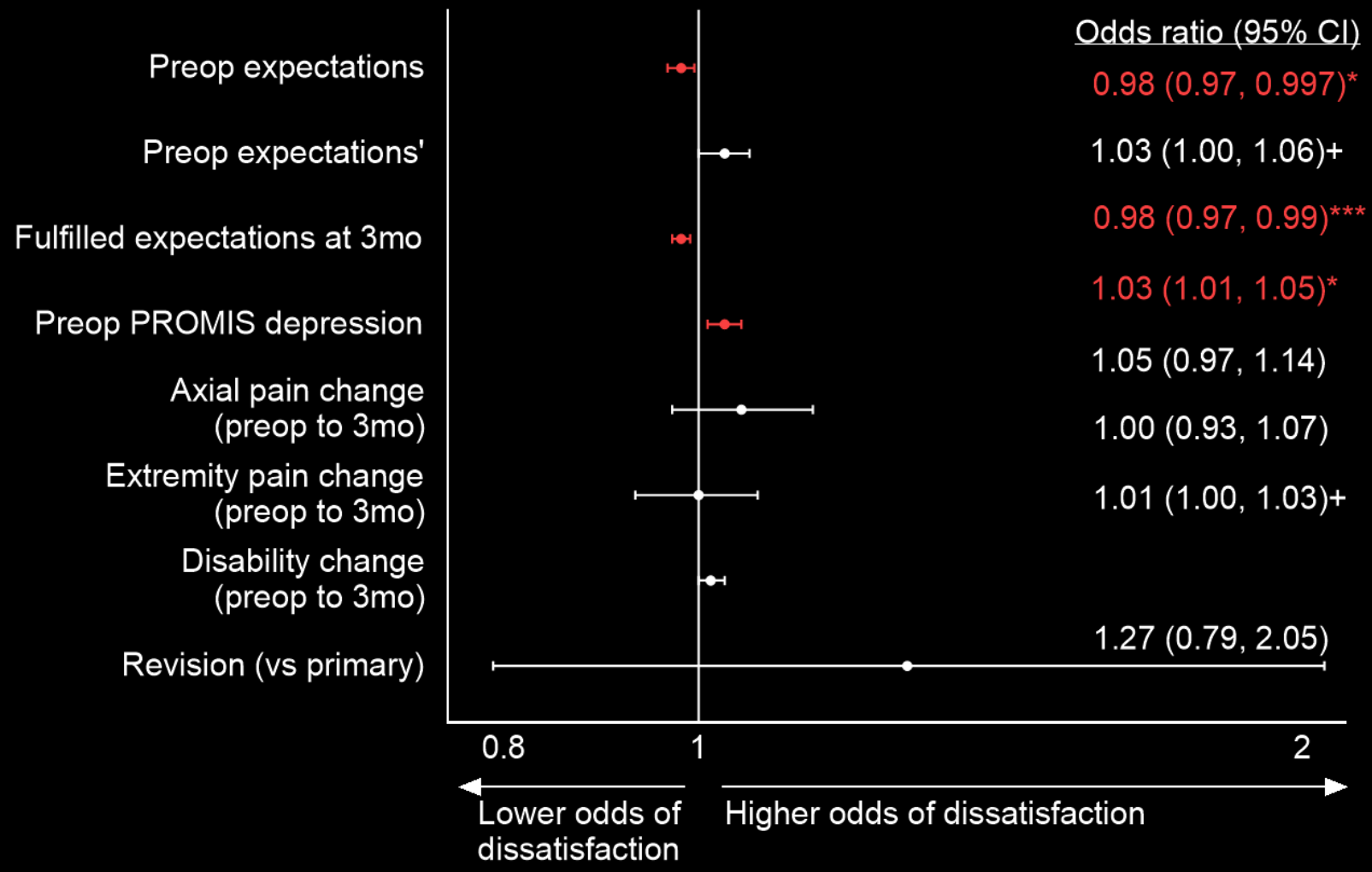
Covs: sex, age, race, education, Elixhauser comorbidity index, employment, insurance, ambulation, motor deficits, BMI, current smoker, preop opioid use, approach

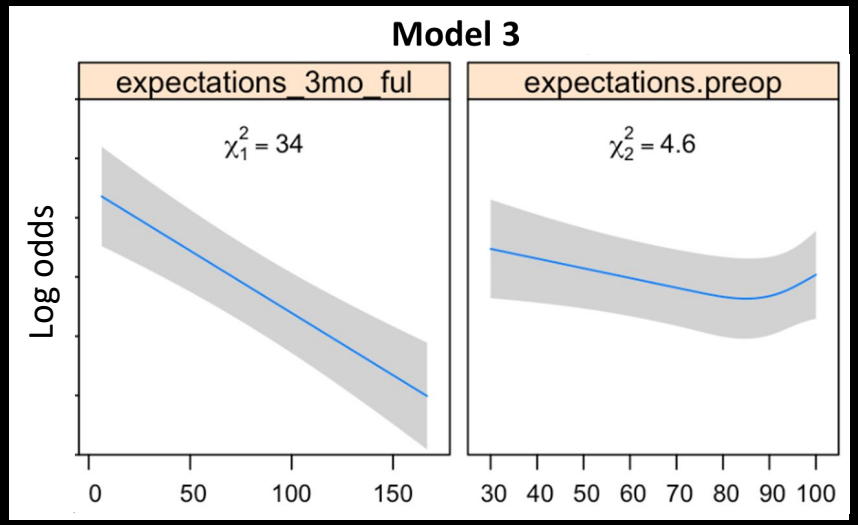
Predictor Importance Plot – Model 3



In model 3, expectations fulfilled was a stronger predictor of 12-month dissatisfaction than preop expectations

Model 3: Preop & Fulfilled Expectations (R^2=0.27)





For preop expectations, higher expectations were associated with lower dissatisfaction. The positive relationship between expectations and dissatisfaction at the highest levels of preop expectations can still be seen but the relationship is not significant at $p < 0.05$.

When included in the same model, preop expectations and expectations fulfilled at 3 months were both significant predictors of dissatisfaction at 12 months.

Covs: sex, age, race, education, Elixhauser comorbidity index, employment, insurance, ambulation, motor deficits, BMI, current smoker, preop opioid use, approach

Discussion

Unfulfilled expectations at 3 months was the strongest predictor of dissatisfaction.

Unrealistically high preoperative expectations were associated with dissatisfaction.

These are patients with a “good clinical outcome” (i.e. clinically meaningful decrease in disability and/or pain).

Finding align with Mannion et al: found that the expectation-actuality discrepancy (EA-D: difference between the expected outcome and the actual outcome) is the most important predictor when assessing the global treatment effectiveness at 12-months in patients undergoing lumbar decompression surgery.

Discussion

Other risk factors such as:

Preoperative depression

Revision surgery status

Disability

helped explain why patients reported being dissatisfied with surgery despite having clinically meaningful improvement in disability or pain

Future Directions

- These finding have the potential to inform preoperative educational intervention and other relevant decision-making intervention strategies in improving patient care.
- Future research needed to better understand what a “reasonable” expectation for improvement is after surgery, depending on a patient’s individual characteristics.

Thank You

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