PROMIS 10 Global Mental Health T-Score: An Independent Predictor of Outcomes Following Elective Orthopedic Surgery

Matthew John Solomito[1], Regina Kostyun, Daniel Witmer, John Grady-Benson[2], Heeren Makanji
[1]Hartford Healthcare Bone and Joint Institute, [2]Orthopaedic Associates of Hartford, PC

INTRODUCTION:

Mental illness has been identified as a risk factor associated with poor post-surgical outcomes in orthopaedic surgery. However, a patient's well-being may be just as important, as it may also influence recovery from surgery. Preoperative mental well-being is rarely assessed, as many orthopaedic surgeons do not feel they have the time or resources to appropriately screen their patients prior to undergoing elective procedures. The purpose of this study was to determine if the PROMIS-10 Global Questionnaire's Mental Health T-score (MHT) could be used to identify patients with poor mental well-being and whether those patients experienced a different postoperative recovery course compared to those with average and above average MHT scores.

METHODS:

This was a retrospective study of patients that underwent an elective orthopedic procedure (i.e. total knee and hip arthroplasty, and 1 or 2 level lumbar fusions) between June 2021 and June 2023, and completed the PROMIS 10 Global preoperatively as well as 6 months postoperatively. Patient were excluded if they had cancer, underwent surgery as a result of trauma, had dementia, or had worker's compensation listed as their insurance payer. Patients were divided into 3 groups based on their MHT (Above Average [AA] >50, Average [A] 40-50, Below Average [BA] <40). Variables of interest included: opioid use during the inpatient stay, discharge disposition, pain at discharge and months postop, the PROMIS 10 physical function score (PFS) 6 months postop, post discharge emergency department (ED) utilization, and overall patient satisfaction. Differences in outcomes parameters were assessed using multivariate regression models to control for confounding factors (i.e. age, BMI, surgical type, length of stay, and presence of a preoperative mental illness diagnosis).

RESULTS:

A total of 873 patients (51.1% [AA], 38.4%[A}, 10.5%[BA]) were included (Table 1). MHT was a significant independent predictor of outcome between groups, whereas a preoperative mental health diagnosis was not (Table 2). Although not significant there were trends that indicated patients in the BA group utilized the ED more often than the other study groups (BA: 7.4%, A: 4.5%, AA: 4.5%, p=0.480). Similarly, patient satisfaction was not significantly different between groups, but trends indicated that more patients in the AA group indicate they were satisfied with their outcomes than the other study groups (BA: 86.4%, A: 88.9%, AA: 94.7%).

DISCUSSION AND CONCLUSION:

The PROMIS-10 Global Questionnaire is a valid easily administered tool that can assess an individual's mental wellbeing using the MHT sub score. The results indicated that not only could the MHT score identify patients with poor mental wellbeing, but that those patients with poor mental wellbeing followed a different recovery path after elective orthopaedic surgery. Therefore, BA group was found to be an independent risk factor for increased opioid consumption, pain reporting, physical function, and discharge to a facility for patients undergoing elective orthopedic surgery. Adoption of the PROMIS-10 Global into clinical care can identify patients at risk for challenging immediate post-operative recovery and may assist in planning for preoperative interventions to improve overall outcomes.

Table 1: Demographic comparison among groups

	BA-MHT	A-MHT	AA-MHT	p-value
N	91	336	446	
Age	64.1 ± 12.7	66.3 ± 9.5	67.6 ± 8.7	0.004
BMI	32.2 ± 6.1	32.1 ± 6.3	30.3 ± 5.5	0.001
Length of Stay	2.1 ± 1.5	1.8 ± 1.6	1.3 ± 0.8	<0.001
Sex				
Female	57 (62.7%)	197 (58.7%)	240 (53.8%)	0.190
Male	34 (37.3%)	139 (41.3%)	206 (46.2%)	
Race				
African American	4 (4.4%)	15 (4.5%)	20 (4.5%)	0.536
Caucasian	81 (89.0%)	304 (90.5%)	412 (92.4%)	
Other	6 (6.6%)	17 (5.0%)	14 (3.1%)	
Insurance Payer				
Commercial	5 (5.5%)	9 (2.7%)	6 (1.4%)	<0.001
Medicare	79 (86.8%)	321 (95.5%)	453 (97.5%)	
Medicaid	7 (7.7%)	6 (1.8%)	5 (1.1%)	
Surgical Intervention				
Total Hip Arthroplasty	22 (24.2%)	103 (30.6%)	175 (39.2%)	<0.001
Total Knee Arthroplasty	19 (20.8%)	95 (28.3%)	187 (41.9%)	
Lumbar Fusion	50 (55.0%)	138 (41.1%)	84 (18.8%)	
Preoperative Mental Health Diagnosis				
Yes	24 (26.4%)	65 (19.4%)	45 (10.1%)	<0.001
No	67 (73.6%)	271 (80.6%)	401 (89.9%)	

Table 2: Results of multivariate regression models

Outcome	Predictor	Value	P-value	Coefficient
Opioid Use (MME)	Below Average MHT	164.6 ± 158.0	Reference	Reference
	Above Average MHT	72.1 ± 59.6	0.042	-21.6
	Average MHT	111.2 ± 157.8	0.098	--
	Mental Health Diagnosis		0.112	--
	Length of Stay		<0.001	55.9
	Age		<0.001	-2.2
	Surgical type		0.779	--
Pain at Discharge	Below Average MHT	5 ± 2	Reference	Reference
	Above Average MHT	3 ± 2	<0.001	-1.1
	Average MHT	4 ± 2	<0.001	-1.3
	Mental Health Diagnosis		0.585	--
	Length of Stay		0.231	--
	Age		<0.001	-0.03
	Surgical type		0.031	0.21
Pain 6 Months Post op	Below Average MHT	3 ± 2	Reference	Reference
	Above Average MHT	1 ± 1	<0.001	-1.45
	Average MHT	2 ± 2	0.054	--
	Mental Health Diagnosis		0.491	--
	Length of Stay		0.791	--
	Age		0.059	--
	Surgical type		<0.001	0.79
PROMIS Physical Function at 6 months post op	Below Average MHT	43.0 ± 7.8	Reference	Reference
	Above Average MHT	55.6 ± 6.8	<0.001	7.8
	Average MHT	47.7 ± 6.3	<0.001	7.1
	Mental Health Diagnosis		0.210	--
	Length of Stay		0.542	--
	Age		0.311	--
	Surgical type		<0.001	-2.2
Discharge to a Facility	Below Average MHT	15.4% of patients	Reference	Reference
	Above Average MHT	1.8% of patients	<0.001	0.11 (0.04-0.32)
	Average MHT	5.4% of patients	0.002	0.25 (0.1-0.6)
	Mental Health Diagnosis		0.412	--
	Length of Stay		0.067	--
	Age		0.005	1.06 (1.02-1.11)
	Surgical type		0.331	--