Preoperative Psychiatric Diagnosis Predicts Increased 90-Day Readmissions, Prolonged Length of Stay, and Non-Home Discharge in TKA Patients: Analysis of Over 13,000 Patients

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INTRODUCTION:

Depression and anxiety are notably more prevalent among individuals undergoing total joint arthroplasty compared to the general population, with approximately 25% of these patients experiencing depression. Research examining the relationship between psychiatric conditions and outcomes of total knee arthroplasty (TKA) has produced inconsistent findings. These discrepancies may stem from small sample sizes and differences in the methods used to identify psychiatric patients. Hence, this study aims to assess healthcare utilization metrics, including 90-day readmissions, discharge disposition (DD), and length of stay (LOS) among patients with and without a preoperative psychiatric diagnosis.

METHODS:

A cohort of 13,894 patients undergoing a primary elective unilateral TKA at a large tertiary academic center in the United States between 2016-2022 were included. Electronic medical records were reviewed to identify preoperative (within two years prior to surgery date) psychiatric diagnoses using ICD-9 codes. Psychiatric diagnoses included were anxiety, depression, post-traumatic stress disorder (PTSD), psychosis, bipolar disorder, and substance abuse. If patients had more than one of these diagnoses, they were put into a 'multiple diagnosis' category. Multivariable logistic regression models were used to compare healthcare utilization outcomes between those with psychiatric diagnosis versus those without. The models were controlled for pre-specified demographics and surgical confounding variables including location for the LOS model The ranking of predictors was made by ranking the Akaike Information Criterion (AIC) increase through the iterative calculation of AIC difference between the model without the predictor of interest and the full model. An AIC increase ≥ 2 suggests a statistically better model. All tests were two-sided, with a Type I error rate of 0.05. Cohort characteristics are displayed in **Table 1**.

RESULTS:

There were 3,830 patients out of 13,894 (28%) with a psychiatric diagnosis before their TKA. After adjusting for possible confounding variables, patients with a preoperative psychiatric diagnosis had a 49% higher likelihood of 90-day readmission (odds ratio [OR] 1.49; 95% confidence interval [CI]: 1.29, 1.73; $p<0.001$) as well as non-home discharge (OR: 1.49; 1.3, 1.71; $p<0.001$) compared to those without a psychiatric diagnosis before TKA **(Table 2)**. Psychiatric diagnosis was the 3rd most important predictor for 90-day readmission with an AIC of 28.2 **(Figure 1)**. Finally, those with psychiatric diagnosis were also more likely to have a LOS >=2 days compared to those without psychiatric diagnosis (OR: 1.18; 1.04, 1.34; P-value < 0.001) **(Table 3)**.

DISCUSSION AND CONCLUSION:

Nearly a third of patients undergoing primary TKA have a preoperative psychiatric diagnosis. Patients with a psychiatric diagnosis before TKA are significantly more likely to be readmitted within 90-days, have non-home discharge, and a longer hospital stay. This highlights the need to include the presence of a diagnosed psychiatric illness in patient risk stratification, education, and appropriate management and optimization of their condition before the surgery. Future research should explore the effectiveness of targeted interventions like cognitive behavioral therapy and pharmacological management to determine how a collaborative approach between orthopedic surgeons and psychiatrists could enhance the care quality for TKA patients with psychiatric disorders.

Figure 1 - Top ranking variables for predicting 90-day readmission

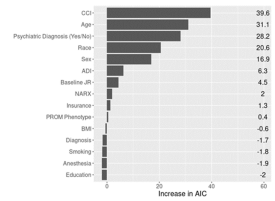

Table 1 - Cohort demographics comparing psychiatric versus non-psychiatric diagnosis patients undergoing TKA

Variable	Level	Total (N=13594)	No Psychiatric Diagnosis (N=10064)	Psychiatric Diagnosis (N=3530)	P-value
Age		67.0 [60.0;73.0]	67.0 [61.0;74.0]	65.0 [58.2;72.0]	<0.001
Sex	Male	5565 (40.1%)	4507 (44.8%)	1058 (27.6%)	<0.001
	Female	8329 (59.9%)	5557 (55.2%)	2772 (72.4%)	
BMI		31.2 [27.5;35.9]	30.8 [27.1;35.4]	32.2 [28.0;36.9]	<0.001
Race	White	1131/9 (83.6%)	8194 (83.7%)	3125 (83.4%)	0.314
	Black	372 (2.75%)	279 (2.85%)	93 (2.48%)	
	Other	1847 (13.6%)	1317 (13.5%)	530 (14.1%)	
Education		14.0 [12.0;16.0]	14.0 [12.0;16.0]	13.0 [12.0;16.0]	<0.001
Smoking	Never	7842 (58.4%)	5959 (59.2%)	1883 (49.2%)	<0.001
	Quit <6m	461/6 (33.2%)	3263 (32.4%)	1353 (35.3%)	
	Quit >6m	475 (3.42%)	295 (2.93%)	180 (4.70%)	
	Current	960 (6.91%)	546 (5.43%)	414 (10.8%)	
ADI		51.0 [33.0;70.0]	51.0 [33.0;74.0]	61.0 [40.0;81.0]	<0.001
CCI		1.00 [0.00;2.00]	0.00 [0.00;2.00]	1.00 [0.00;2.00]	<0.001
Insurance	Private	4332 (31.1%)	3232 (34.4%)	1100 (31.8%)	<0.001
	Medicaid	619 (5.02%)	298 (3.36%)	321 (9.27%)	
	Medicare	7189 (58.3%)	5179 (58.4%)	2010 (58.1%)	
	Other	191 (1.55%)	160 (1.80%)	31 (0.90%)	
PROM Phenotype	Pain+ PS+ MCS+	3045 (21.9%)	2300 (23.6%)	465 (12.2%)	<0.001
	Pain+ PS+ MCS-	1926 (13.9%)	1515 (15.1%)	611 (16.0%)	
	Pain+ PS- MCS+	446 (3.21%)	377 (3.75%)	69 (1.80%)	
	Pain+ PS- MCS-	895 (5.36%)	326 (3.24%)	169 (4.42%)	
	Pain- PS+ MCS+	1077 (7.76%)	890 (8.85%)	187 (4.89%)	
	Pain- PS+ MCS-	1198 (8.63%)	794 (7.89%)	404 (10.6%)	
	Pain- PS- MCS+	1953 (13.9%)	1538 (15.3%)	397 (10.4%)	
	Pain- PS- MCS-	3765 (27.1%)	2240 (22.3%)	1525 (39.9%)	

Variable	Level	Total (N=13594)	No Psychiatric Diagnosis (N=10064)	Psychiatric Diagnosis (N=3530)	P-value
Diagnosis	OA	13453 (98.8%)	9765 (97.0%)	3688 (96.3%)	0.031
	non-OA	441 (3.17%)	299 (2.97%)	142 (3.71%)	
Anesthesia	General	3312 (24.1%)	2501 (25.2%)	811 (21.3%)	<0.001
	Spinal	9986 (72.7%)	7114 (71.6%)	2872 (75.5%)	
	Other	437 (3.18%)	317 (3.19%)	120 (3.16%)	
Narx		1.00 [0.00;1.00]	0.00 [0.00;1.00]	1.00 [0.00;2.00]	<0.001
LOS	<2 days	8499 (61.9%)	6311 (63.3%)	2188 (57.3%)	<0.001
	>=2 days	5236 (38.1%)	3621 (36.3%)	1615 (42.3%)	
DD	Home/HHC	12524 (90.1%)	9205 (91.3%)	3319 (90.7%)	<0.001
	Other	1370 (9.86%)	859 (8.54%)	511 (13.3%)	
Readmission	No	12672 (92.3%)	9267 (93.3%)	3405 (89.3%)	<0.001
	Yes	1063 (7.74%)	665 (6.70%)	398 (10.3%)	
Reoperation	No	13210 (95.4%)	9613 (95.5%)	3645 (95.2%)	0.404
	Yes	636 (4.58%)	451 (4.48%)	185 (4.83%)	

Data reported as median [IQR] or n (%)

BMI: body mass index, ADI: area deprivation index, CCI: Charlson comorbidity index, NARX: narcotic opioid risk score, LOS: length of stay, DD: discharge disposition, HHC: home health care

Table 2 - Multivariable logistic regression model using Discharge Disposition and Readmission as outcomes

		Non-Home DD			90-day Readmission		
Factor	Level	OR (95%CI)	P-value	Overall P-value	OR (95%CI)	P-value	Overall P-value
Group	Psychiatric Diagnosis (v no Psychiatric Diagnosis)	1.49 (1.3, 1.71)	<0.001	<0.001	1.49 (1.29, 1.73)	<0.001	<0.001

This model was adjusted for Age, Sex, BMI, Race, Education, Smoking, ADI, CCI, Insurance, Diagnosis, Anesthesia, PROM Phenotype, Baseline JR, Narx

Table 3 - Multivariable logistic regression model using LOS >= 2 as the outcome

Factor	Level	OR (95%CI)	P-value	Overall P-value
Group	Psychiatric Diagnosis (v no Psychiatric Diagnosis)	1.18 (1.04, 1.34)	0.009	0.009

This model was adjusted for Age, Sex, BMI, Race, Education, Smoking, ADI, CCI, Insurance, Diagnosis, Anesthesia, PROM Phenotype, Baseline JR, Narx