

Social Determinant of Health: Z-codes Could Signal Future Low Compliance with Patient-Reported Outcome Measurer after Total Hip Arthroplasty.

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INTRODUCTION: Arthroplasty literature shows a paucity in analyzing patients’ compliance of filling out patient reported outcome measures (PROMs) after total hip arthroplasty (THA). Social Determinants of Health (SDOH) refers to a group of social factors which are not classifiable elsewhere that can have significant impact on the healthcare outcomes. The purpose of this investigation was to assess the relationship between SDOH codes, demographic and surgical factors, and compliance rates for filling out PROMs after TKA.

METHODS: This was a retrospective cohort study of all elective THA cases performed for osteoarthritis between 2017 – 2022. Patients <18 years of age, non-elective surgeries, and patients with less than 2 years of follow-up were excluded. All SDOH (“Z” codes), mental health codes (“F” codes) and compliance rates were collected and recorded. The study population was binarized into two cohorts: any compliance vs no compliance. Bivariate and multivariate regression (MVR) analyses were performed to assess compliance with PROMs against several SDOH, demographic and surgical factors.

RESULTS: A total of 3,392 cases were included of which, 1,779 (52.5%) had completed at least one set of PROM questionnaires while 1,613 (47.5%) were non-compliant. Overall compliance was 25.8%. Results of the MVR indicated that having any “Z” codes (OR 0.355 [95%CI 0.123 – 0.842], p=0.045), being a non-English speaker (OR 0.202 [95%CI 0.065 – 0.631], p=0.006) and male gender (OR 0.845 95%CI [0.731 – 0.977], p=0.023) to be independent risk factors for non-compliance. Conversely, married (OR 1.540 [95%CI 1.329 -1.784], p=0.001) or employed patients (OR 1.445 95%CI [1.216 – 1.717], p=0.001) had higher odds of being compliant.

DISCUSSION AND CONCLUSION: Overall compliance with PROMS after THA at two years was 25.8%. While Z-codes adversely affected compliance rates, not being an English speaker was the biggest factor for PROM non-compliance. Employed or married patients were more likely to be compliant with filling out PROMs.

	Compliant	Non-Compliant	p-value
Cases	1779	1613	
Average age (SD)	64.1 (10.3)	65 (12.3)	0.019
Average BMI (SD)	31 (5)	31 (6.2)	0.418
Gender, n (%)			
Male	809 (45.5%)	784 (48.6%)	0.068
Female	970 (54.5%)	829 (51.4%)	
Laterality			
Right	956 (53.7%)	882 (54.7%)	0.582
Left	823 (46.3%)	731 (45.3%)	
ASA Score, n (%)			
One	25 (1.4%)	34 (2.1%)	
Two	861 (48.4%)	671 (41.6%)	<0.001
Three	844 (47.4%)	890 (55.2%)	
Four	11 (0.6%)	15 (1.1%)	
Race, n (%)			
White	1726 (97%)	1545 (95.5%)	
Black/African American	20 (1.1%)	52 (3.2%)	0.036
Asian	2 (0.1%)	3 (0.2%)	
American Indian/Alaska Native	3 (0.2%)	2 (0.1%)	
Native Hawaiian/Other Pacific Islander	1 (0.1%)	1 (0.1%)	
Other/Unable to obtain	18 (1%)	10 (0.6%)	
Language, n (%)			
English	1776 (99.8%)	1597 (99%)	0.001
Other	3 (0.2%)	16 (1%)	
Active smoker, n (%)	185 (10.4%)	247 (15.3%)	0.001
Marital status, n (%)			
Married/With Partner	1166 (65.5%)	880 (54.6%)	<0.001
Single/Divorced/Widowed	613 (34.5%)	733 (45.4%)	
Employment Status, n (%)			
Full Time	585 (32.9%)	424 (26.5%)	<0.001
Unemployed	240 (13.5%)	290 (18%)	
Part Time	94 (5.3%)	62 (3.8%)	
Retired	868 (48.8%)	837 (51.5%)	
Insurance status, n (%)			
Private	979 (55%)	853 (52.9%)	
Medicare/Medicaid	763 (42.9%)	719 (44.6%)	0.659
Government/Military	31 (1.7%)	53 (3.2%)	
No Fault/Worker's Comp	3 (0.2%)	3 (0.2%)	
Uninsured	3 (0.2%)	5 (0.3%)	
Arthroplasty Procedure, n (%)			
Manual THA	1032 (58%)	1030 (63.9%)	<0.001
Robotic THA	378 (21.2%)	319 (19.8%)	
Anterior THA	369 (20.8%)	264 (16.4%)	

Table 1: Baseline demographic and surgical characteristics of included patients stratified compliance with filling out patient-reported outcome measure (PROM) questionnaires.

% of present SDOH & F Codes*	Compliant	Non-Compliant	p-value
Z57 - Problems related to education and literacy	24 (1.3%)	17 (1.1%)	0.442
Z56 - Problems related to employment and unemployment	11 (0.6%)	11 (0.7%)	0.817
Z57 - Occupational exposure to risk factors	3 (0.2%)	6 (0.4%)	0.250
Z58 - Problems related to physical environment	3 (0.2%)	4 (0.2%)	0.611
Z59 - Problems related to housing and economic circumstances	39 (2.2%)	84 (5.2%)	0.002
Z60 - Problems related to social environment	7 (0.4%)	2 (0.1%)	0.127
Z62 - Problems related to upbringing	3 (0.2%)	0 (0%)	0.148
Z63 - Other problems related to primary support group, including family circumstances	61 (3.4%)	41 (2.5%)	0.130
Z64 - Problems related to certain psychosocial circumstances	0 (0%)	1 (0.1%)	
Z65 - Problems related to other psychosocial circumstances	5 (0.3%)	4 (0.2%)	0.851
Total number of patients with any "Z" code	121 (6.8%)	128 (7.9%)	0.206
Total number of patients with any "F" code	1189 (67.4%)	1096 (67.6%)	0.911

*. Social determinants of health
Table 2: Distribution of SDOH and F codes amongst the included patients in the study categorized by compliance status.

Variable	Odds Ratio [95%CI] for Compliance	p-value
Z AND F CODES		
Any Z code	0.355 [0.123 – 0.842]	0.045
Any F code	1.114 [0.952 – 1.302]	0.175
DEMOGRAPHIC AND SURGICAL VARIABLES		
Married/With Partner	1.540 [1.329 – 1.784]	0.001
Laterality (Right)	1.082 [0.919 – 1.247]	0.278
Non-English Speaker	0.202 [0.065 – 0.631]	0.006
Employed	1.445 [1.216 – 1.717]	0.001
Racial Minority (Non-white)	0.743 [0.502 – 1.095]	0.136
Insured (Medicare or Medicaid)	0.872 [0.640 – 1.191]	0.931
Age	0.993 [0.985 – 1]	0.054
BMI	1.004 [0.994 – 1.013]	0.389
Current smoker	0.617 [0.492 – 0.773]	0.617
Had Manual THA	0.942 [0.792 – 1.119]	0.494
Male	0.845 [0.731 – 0.977]	0.023

Table 3: Multivariate logistic regression showing odds ratios and 95% Confidence Intervals for Z codes, F codes and baseline demographic and surgical variables.