

# Discharge With Home Health Services Following Primary Total Shoulder Arthroplasty Does Not Adversely Affect 90-day ED Visits Or Readmissions

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## INTRODUCTION:

Interventions aimed at optimizing patients preoperatively and implementing standardized postoperative discharge pathways have gained traction to reduce 90-day ED returns, readmissions and potentially EOC costs. Specifically, the use of home health services (HHS) upon discharge has gained interest for reducing the risk for these adverse outcomes. Interestingly, however, Sequeria et al, in a national database study utilizing propensity-score matching, found a significantly higher risk for 90-day return to ED and readmission following primary total hip arthroplasty (THA) for patients discharged with HHS versus self-care. Wieland and colleagues demonstrated a higher rate of 90-day readmission following TSA discharge with HHS, though no association could be demonstrated between HHS and both 30- and 90-day ED return. Understanding the reasons for the negative association between discharge with HHS and clinical outcomes would be crucial to identify those circumstances under which patients might benefit from those services while reducing cost burden to the healthcare system.

The primary objective of the current study was to assess the association between discharge with HHS with or without a home health aide (HHA) following elective TSA and the risk for 90-day ED visits and unplanned all-cause readmissions. A secondary objective was to determine independent surgical- and patient-related risk factors for 90-day ED visits and readmissions following TSA.

## METHODS:

We performed a retrospective assessment of all primary elective aTSA and rTSA conducted from January 2016 through April 2024 at a single tertiary-referral teaching hospital. Inclusion criteria included all patients who underwent an elective primary aTSA or rTSA who underwent surgery with a minimum 90-day follow-up period.

We queried electronic health records (EHRs) to ascertain patient demographics including age, sex, body mass index (BMI), marital status, self-identified race, smoking status, age-adjusted Charlson Comorbidity Index (ACCI), modified 5-item Frailty Index (mFI-5), straight-line distance from home-to-clinic, and clinically diagnosed mental health disorder. We collated sociodemographic status via the Area Deprivation Index (ADI), a tool that ranks neighborhoods by socioeconomic disadvantage at both the state and national level. The mFI-5 score was categorized as <2 versus ≥2 in this study. The arthroplasty type (aTSA vs. rTSA), American Society of Anesthesiologists (ASA) score, hospital length of stay (LOS), intraoperative surgical complications, postsurgical complications within 4 weeks of surgery, in-hospital medical complications, and operative time was obtained. The 12-month preoperative and 90-day postoperative ED visits, in addition to the 90-day unplanned all-cause readmissions, were recorded. The 12-month preoperative ED visits were included based on a prior study that found them to be independent predictors of 90-day ED return following aTSA.

## RESULTS:

There was a total of 357 cases during the study period, of which 30 (8%) were excluded for non-home discharge (22 to subacute nursing facility (SNF) and 8 to subacute rehabilitation (SAR)). This resulted in 327 cases, including 166 (51%) rTSA and 161 aTSA (49%) procedures. The median age was 68 years (IQR 60,73) with 206 (58%) females. There were 121 (37%) patients who were discharged with HHS, of which 49 (40%) also had access to an HHA.

### **90-day ED Visit**

There were 51 (15.6%) patients with a 90-day return to the ED, encompassing 70 total visits. Of these, 53 (75.7%) were medically-related and 17 were surgically-related. There were more medically-related ED visits from 31-90 days compared with ≤30 days (OR 5.5, 95% CI 1.6-19.5,  $P=0.009$ ).

There was no difference between patients discharged with versus without HHS with regards to the having at least one medically-related (14.9% vs 11.2%, respectively;  $P=0.43$ ) or surgically-related (7.4% vs 2.9%, respectively;  $P=0.06$ ) 90-day ED return. Following regression analysis, discharge with HHS, both with and without concomitant HHA, was not significantly associated with 90-day ED return.

### **90-day Readmission**

There was a total of 23 (7%) readmissions within 90 days postoperatively and no patient was admitted more than once.

There was no difference between patients discharged with versus without HHS with regards to 90-day readmission. Following regression analysis, discharge with HHS, both with and without HHA, was not associated with 90-day readmission.

**DISCUSSION AND CONCLUSION:** The main findings of this single-institution retrospective study were that the use of discharge HHS following elective TSA, both with and without concomitant HHA, was not independently associated with either 90-day ED return or unplanned readmission. Furthermore, there was no difference in either medically- or surgically-related 90-day ED return between patients discharged with versus without HHS. While the assignment of HHS following

TSA appeared to provide comparable 90-day outcomes to patients discharged with self-care, further understanding as to which patients would most benefit from its usage is needed.

Table 1. Patient and surgical demographic data by discharge with or without home health services

	Home without service N = 206	Home with service N = 121	P value
Age, mean ± SD	65.6 (9.8)	63.2 (8.8)	0.013
Distance to clinic, median (IQR)	2.9 (2.1, 4.5)	2.8 (2.3, 4.1)	0.715
1HR time to clinic, median (IQR)	4 (3, 5)	4 (3, 5)	0.911
ADL medical %, median (IQR)	21.5 (13, 30)	21.1 (8, 29)	0.915
Number of people with arthritis, median (IQR)	2 (0, 4)	3 (0, 4)	0.300
ESIC, median (IQR)	23.7 (20.1, 26.5)	20.9 (20.6, 23.6)	0.014
ACCU, median (IQR)	3 (0, 4)	3 (2, 4)	0.061
Operative time, median (IQR)	110 (100, 120)	116 (96, 134)	0.500
TTV30, median (IQR)	232.1 (168.5, 297.0)	206.1 (126.1, 305.9)	0.153
Discharge day, median (IQR)	2 (0, 2)	2 (0, 2)	<0.001
Pain POD1, median (IQR)	4 (0, 7)	4 (2, 7)	0.175
Pain at discharge, median (IQR)	2 (0, 4)	2 (0, 4)	0.100
Pain change from POD1, median (IQR)	1 (0, 4)	1 (0, 5)	0.923
Gender, n (%)			<0.001
Female	114 (55.3)	82 (76.0)	
Male	92 (44.7)	29 (24.0)	
Race, n (%)			0.196
White	114 (55.3)	76 (63.6)	
Black	92 (44.7)	45 (37.2)	
Preferred language, n (%)			0.005
English	160 (77.7)	79 (65.3)	
Spanish	42 (20.4)	42 (34.7)	
Other	4 (1.9)	0	
Insurance type, n (%)			0.008
Medicare	126 (61.2)	62 (56.0)	
Medicaid	42 (20.4)	20 (16.5)	
Commercial	38 (18.5)	9 (7.4)	
None	4 (1.9)	0 (0.0)	
Diagnosis, n (%)			0.623
Disruptive	95 (46.1)	71 (58.7)	
Disruptive	67 (32.5)	37 (30.5)	
Other	3 (1.5)	3 (2.5)	
Depression, n (%)			0.178
Yes	157 (76.2)	84 (69.4)	
No	49 (23.8)	37 (30.6)	
Activity, n (%)			0.136
Yes	130 (63.1)	97 (80.2)	
No	28 (13.6)	24 (19.8)	
ADLs, n (%)			0.810
≥2	96 (46.6)	58 (47.9)	
1-2	105 (51.0)	52 (42.8)	
0	18 (8.7)	22 (18.2)	
Medicaid, n (%)			0.594
None	105 (51.0)	58 (47.9)	
Former	24 (11.6)	10 (8.3)	
Current	27 (13.1)	13 (10.7)	

Table 2. Factors associated with 90-day return to ED on multivariable logistic regression

Characteristic	Adjusted Odds Ratio (95% CI)	P value
Discharge disposition		
HHB with HHB	1.41 (0.55 - 3.61)	0.478
HHB without HHB	1.41 (0.96 - 2.20)	0.033
No HHB with HHB	1.67 (0.58 - 4.71)	0.147
No HHB without HHB (reference)	1	
ADLs		
Yes	2.99 (1.38 - 6.42)	0.007
No (reference)	1	
Surgical postop complication		
Yes	3.88 (1.40 - 9.42)	0.001
No (reference)	1	
ED visit within 12 months prior to surgery		
For none	10.04 (3.55 - 28.27)	<0.001
1-2	4.43 (2.23 - 9.60)	<0.001
0 (reference)	1	

ED, Emergency Department; HHB, Home health service; HHB, Home health aide; CI, Confidence interval

Table 3. Factors associated with readmission to 90-days post-surgery on multivariable logistic regression

Characteristic	Adjusted Odds Ratio (95% CI)	P value
Discharge disposition		
HHB with HHB	0.42 (0.08 - 2.32)	0.322
HHB without HHB	1.80 (0.55 - 5.21)	0.361
No HHB with HHB	1.80 (0.36 - 9.01)	0.424
No HHB without HHB (reference)	1	
ADLs		
Yes	6.00 (0.81 - 40.99)	0.027
No (reference)	1	
ADL score decline		
Yes	1.39 (1.06 - 1.83)	0.014
No (reference)	1	
Surgical postop complication		
Yes	10.66 (3.76 - 30.25)	<0.001
No (reference)	1	
ED visit in 12 months prior to surgery		
For none	3.89 (0.79 - 17.27)	0.098
1-2	0.92 (0.29 - 2.95)	0.890
0 (reference)	1	
mFES		
≥5	2.87 (0.97 - 7.39)	0.058
0-4 (reference)	1	

ED, Emergency Department; HHB, Home health service; HHB, Home health aide; CI, Confidence interval; HHB, Home health aide; mFES, modified 5-item, frailty index; ADL, Area Dependent Index