

Predictors of Discharge Home versus Inpatient Rehabilitation Following Total Hip and Knee Arthroplasty – Cohort Study

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Introduction

Total joint arthroplasty (TJA) accounts for significant healthcare expenditures globally (1-3). The use of inpatient rehabilitation (IPR) constitutes a substantial cost of TJA (1, 4, 5). Despite this, IPR is not associated with superior outcomes when it is compared to other rehabilitation options, such as discharge directly home with outpatient physiotherapy or a home exercise program (1, 6-9).

This study aims to identify the prevalence of inpatient rehabilitation (IPR) use in an Australian private total joint arthroplasty (TJA) cohort, and identify factors predictive of IPR discharge, including components of the Risk Assessment and Prediction Tool (RAPT).

Materials and methods

Primary TJA patients at a Sydney private hospital, between 2021-2022 were identified from an institutional arthroplasty database that prospectively records demographics, operative data and patient-reported outcomes measures (PROMs).

Variables previously deemed as predictive factors for IPR facility discharge in the literature and components of RAPT were assessed utilising multivariable generalized linear model analysis.

- Predictor Variables:**
- RAPT questions – (Figure 2)
 - Age
 - Unilateral/bilateral
 - Body Mass Index (BMI)
 - Surgeon
 - ASA
 - EQ-5D – Anxiety/Depression
 - EQ VAS – a self-perceived health status
 - Joint pain & Back Pain – VAS (0-100)
 - Oxford Hip/Knee and HOOS-12/KOOS-12
 - Socio-economic Indexes for Areas (SEIFA) 2016

Conclusions

The use of IPR following THA was associated with bilateral procedures, living alone, older age and having a limited walking distance preoperatively. In TKA, IPR referral was associated with bilateral procedures, older age, surgeon, living alone, female and obesity. The RAPT score was not a good predictor of discharge destination, as such it should not be used in current TJA discharge planning. Some of the predictors of IPR may be clinically appropriate (i.e. bilateral procedure, age >75 and living alone); however, the clinical relevance of other factors found in this study could be targeted to reduce unnecessary IPR referral in the private sector.

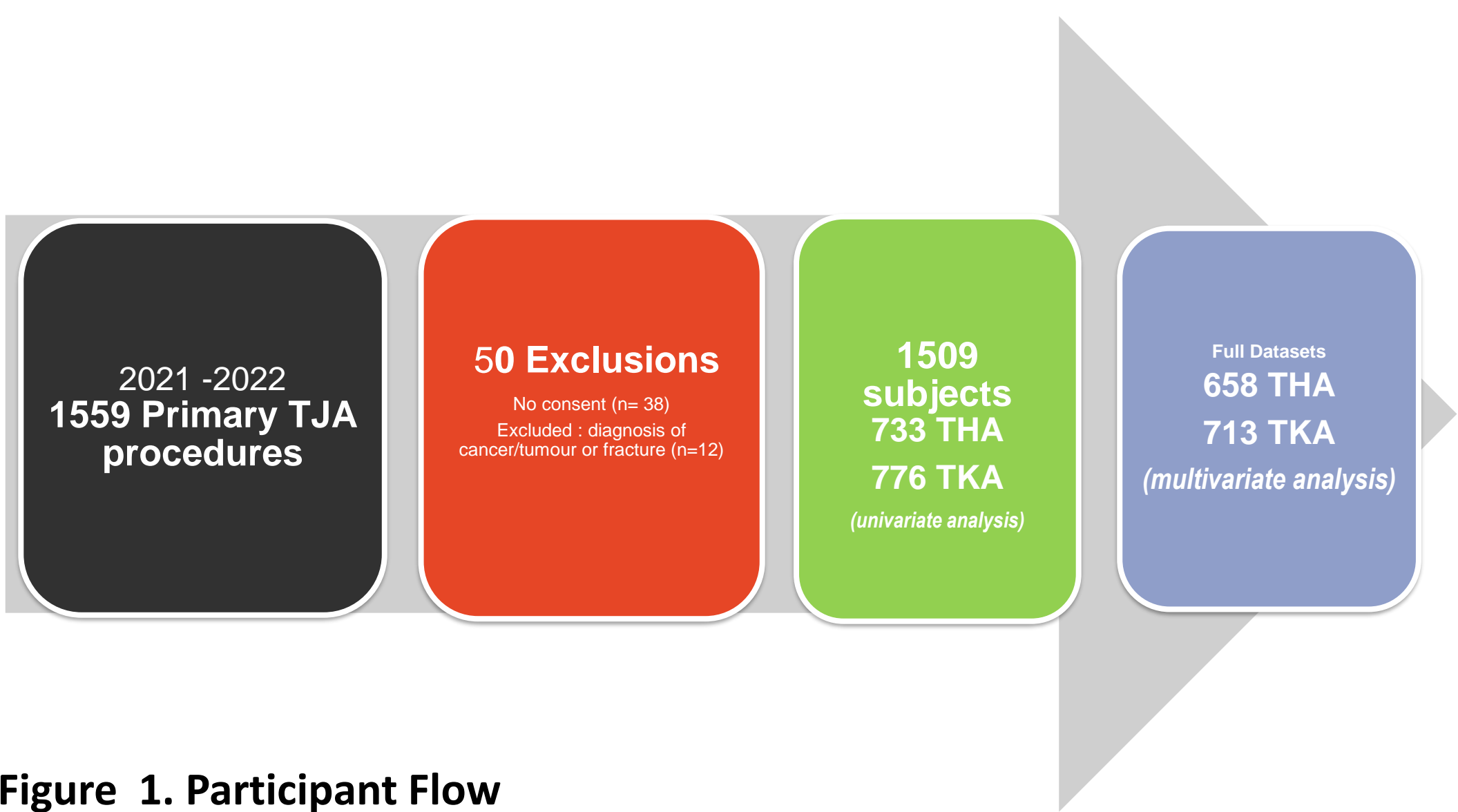


Figure 1. Participant Flow

	Value	Score
1. What is your age group	50-65 years 66-75 years >75 years	=2 =1 =0
2. Gender?	Male Female	=2 =1
3. How far, on average, can you walk? (a block is 200 meters)	Two blocks or more (+/- rests) 1-2 blocks (the shopping centre) Housebound (most of the time)	=2 =1 =0
4. Which gait aid do you use? (more often than not)	None Single point stick Crutches/frame	=2 =1 =0
5. Do you use community supports? (home help, meals-on-wheels, district nurse)	None or one per week Two or more per week	=1 =0
6. Will you live with someone who can care for you after your operation?	Yes No	=3 =0
Your score (out of 12)		

KEY:
Scores < 6 : high risk → prediction: discharge extended inpatient rehabilitation
Scores < 9 : low risk → prediction: discharge directly home
Scores 6-9 : medium risk → prediction: additional intervention to discharge directly home

Figure 2. The Risk Assessment and Prediction Tool - adapted from the original validation study of RAPT, Oldmeadow et al (11)

Results

Predictors of Discharge to IPR following THA

Forty-six percent (n= 344) of the THA cohort were discharged to an IPR facility following their acute surgical stay. The referral to IPR following THA was associated with bilateral procedure, living alone, older age and limited walking distance during pre-operative period, as shown in Table 1.

RAPT Prediction (<6 = IPR ; 6-12 = Home)	Actual Discharge Destination		Total
	Inpatient Rehabilitation	Home	
Inpatient Rehabilitation	106	23	129
Home	615	661	1276
Total	721	684	1405

Table 3. RAPT Prediction and Actual Discharge Destination

Predictors of Discharge to IPR following TKA

Sixty-four percent (n= 500) of the TKA cohort were discharged to an IPR facility following their acute surgical stay. Predictors of discharge to IPR were bilateral procedure, older age, surgeon, living alone, female gender and obesity, as shown in Table 2.

Accuracy of the Risk Assessment and Prediction Tool (RAPT) for current TJA population

The count for the actual discharge destination and RAPT prediction are shown in Table 3. The RAPT has a high specificity to predict IPR discharge (96.6%), but has low sensitivity (14.7%) in predicting home discharge. The RAPT score predicted home discharge in 618 THA patients, but only 358 of these (58%) achieved a home discharge. The RAPT score predicted home discharge in 658 TKA patients, but only 257 of these (39%) achieved a home discharge.

THA Predictors of Discharge to IPR

46% of all THA were discharged to inpatient rehab

	Home	Inpatient	OR	95% CI	P
N = 733	389	344			
Bilateral					
No	367 (56%)	285 (48%)	-	-	-
Yes	22 (28%)	59 (72%)	7.9	3.5 - 17.8	<0.001
Will you live with someone (RAPT)					
Yes	345 (62%)	207 (38%)	-	-	-
No	35 (22%)	122 (78%)	5.2	3.1 - 8.8	<0.001
Age (RAPT)					
50-65	228 (66%)	117 (34%)	-	-	-
66-75	116 (50%)	118 (50%)	2.1	1.4 - 3.3	0.001
>75	42 (29%)	109 (71%)	5.0	2.8 - 9.0	<0.001
Walking distance (RAPT)					
Two or more blocks	246 (66%)	128 (34%)	-	-	-
1-2 blocks	106 (45%)	128 (55%)	1.6	1.1 - 2.5	0.023
Housebound	28 (28%)	73 (72%)	2.7	1.3 - 5.6	0.009

Non significant factors:
Socio-economic status, obesity, ASA, EQ-5D Anxiety/depression, self-general health rating, joint pain, back pain, HOOS-12 Score, Surgeon, RAPT questions regarding gender, walking aids and community supports

Table 1. Odd Ratios (ORs) for Discharge to Inpatient Rehab following THA

TKA Predictors of Discharge to IPR

64% of all TKA were discharged to inpatient rehab

	Home	Inpatient	OR	95% CI	P
N = 776	276	500	-	-	-
Bilateral					
No	236 (45%)	284 (55%)	-	-	-
Yes	20 (16%)	108 (84%)	6.9	3.5 - 13.3	<0.001
Age (RAPT)					
50-65	125 (43%)	165 (57%)	-	-	-
66-75	121 (35%)	222 (65%)	1.7	1.1 - 2.8	0.021
>75	30 (21%)	113 (79%)	4.2	2.7 - 9.0	<0.001
Surgeon					
1	46 (60%)	31 (40%)	-	-	-
2	7 (35%)	13 (65%)	1.5	0.3 - 6.4	0.607
3	69 (39%)	110 (61%)	2.3	1.1 - 4.7	0.024
4	71 (24%)	228 (76%)	3.0	1.5 - 6.4	0.003
5	53 (39%)	84 (61%)	2.2	1.0 - 4.7	0.046
6	15 (41%)	22 (59%)	2.1	0.7 - 6.1	0.199
7	7 (64%)	4 (36%)	0.4	0.6 - 2.3	0.295
8	8 (50%)	8 (50%)	1.4	0.3 - 5.9	0.658
Will you live with someone (RAPT)					
Yes	241 (41%)	347 (59%)	-	-	-
No	25 (20%)	101 (80%)	2.9	1.6 - 5.2	0.001
Female	100 (26%)	286 (74%)	2.5	1.6 - 3.8	<0.001
Obesity	107 (29%)	258 (71%)	1.8	1.2 - 2.6	0.006

Non significant factors:
Socio-economic status, ASA, EQ-5D Anxiety/depression, self-general health rating, joint pain, back pain, HOOS-12 Score, RAPT questions regarding walking aids, walking distance and community supports

Table 2. Odd Ratios (ORs) for Discharge to Inpatient Rehab following TKA

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