Factors Affecting Outpatient Physical Therapy Attendance Following Total Knee Arthroplasty

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Introduction

INTRODUCTION: Total knee arthroplasty (TKA) is an elective procedure aimed at restoring functionality and improving quality of life for patients who suffer from severe knee pain and limitation. Following TKA, physical therapy (PT) is universally recommended to optimize function, strength, and range of motion (ROM). It is important to identify what patient factors predict engagement in and completion of a full course of PT. The goal of this study is to identify what patient factors predict engagement in and completion of a full course of PT defined as ≥ 2 sessions attended and ≥ 16 sessions attended, respectively.

METHODS: 270 patients who had undergone single-knee primary TKA at an urban academic private hospital by the same operating physician between January 2016 through December 2019 were selected for this study. Patient demographic data were analyzed in comparison to the number of PT sessions completed by patients. The number of appointments completed by each patient was determined by reviewing signed PT notes. Distance to clinic was calculated in kilometers using the shortest route from the patient's home address to the clinic on Google Maps. For patients who performed PT outside affiliated clinics, a second search was performed using a different electronic medical record system. The number of PT appointments attended and the duration of time over which these appointments took place were analyzed with the demographic factors below to search for correlations with adherence to PT post-TKA. Patients were stratified into categories of adherence (engagement and completion) based on the number of sessions attended.

Table 1. Patient characteristics (n=270)
[1]Characteristic not collected on all patients

	All	Patient with ONLY Ochsner PT (n =219)
Sex, % (n)		
Female	67.4 (182)	68.0 (149)
Male	32.6 (88)	32.0 (70)
Age, % (n)		
<65 years	25.9 (70)	25.1 (55)
≥65 to <75 years	49.6 (134)	50.2 (110)
≥75 years	24.5 (66)	24.7 (54)
Race, % (n)		
Black	38.9 (105)	37.4 (82)
White	56.3 (152)	57.1 (125)
Other	4.8 (13)	5.5 (12)
Body mass index, % (n)		
<25 kg/m²	7.0 (19)	6.8 (15)
≥25 to <30 kg/m²	29.6 (80)	29.7 (65)
≥30 to <35 kg/m²	31.1 (84)	30.6 (67)
≥35 kg/m²	32.2 (87)	32.9 (72)
Education, % (n)[1]		
< High school	14.3 (34)	15.0 (29)
High school graduate	29.8 (71)	29.5 (57)
> High school	55.9 (133)	55.5 (107)
Partner, % (n)[1]	48.7 (129)	49.1 (105)
Insurance type, % (n)		
Private	35.6 (96)	35.6 (78)
Medicare	23.7 (64)	25.1 (55)
Medicare Advantage	34.8 (96)	32.9 (72)
Medicaid	3.7 (10)	4.1 (9)
Other	2.2 (6)	2.3 (5)
Laterality, % (n)		
Right	50.7 (137)	50.7 (111)
Left	49.3 (133)	49.3 (108)
Kellan Laurence grade, % (n) [1]		
0	0 (0)	0 (0)
1	0 (0)	0 (0)
2	0.8 (2)	0.9 (2)
3	7.8 (21)	7.8 (17)
4	91.4 (245)	91.3 (199)
Second surgery		
No 2nd surgery	80.4 (217)	80.4 (176)
2nd surgery < 6 months	5.6 (15)	5.9 (13)
2nd surgery > 6 months	14.0 (38)	13.7 (30)
Distance from PT office, % (n)[1]		
<40 km	86.3 (226)	91.6 (195)
≥40 km	13.7 (36)	8.4 (18)

Table 2. Univariate predictors of completing PT after TKA.
[1]Characteristic not collected on all patients

	PT ≥ 2 (n=270)		PT ≥ 16 (n=219)	
	% (n)	P value	% (n)	P value
Sex		0.819		0.528
Male	87.5 (77)		73.2 (109)	
Female	88.5 (161)		77.1 (54)	
Age, years		0.464		0.929
<65	84.3 (59)		76.4 (42)	
≥65 to <75	88.8 (119)		73.6 (81)	
≥75	90.9 (60)		74.1 (40)	
Race		0.550		0.036
White	87.5 (133)		80.8 (101)	
Black	87.6 (92)		67.1 (55)	
Other	100 (13)		58.3 (12)	
Body mass index, kg/m²		0.770		0.618
<25	88.5 (17)		60.0 (9)	
≥25 to <30	87.5 (70)		75.4 (49)	
≥30 to <35	85.7 (72)		76.1 (51)	
≥35	90.8 (79)		75.0 (54)	
Education[1]		0.823		0.477
< High school	91.2 (31)		69.0 (20)	
High school graduate	88.7 (63)		80.7 (46)	
> High school	86.5 (115)		76.6 (82)	
Partner[1]		0.592		0.271
No	89.0 (121)		71.6 (78)	
Yes	86.8 (112)		78.1 (82)	
Insurance type		0.500		0.454
Private	87.5 (84)		79.5 (62)	
Medicare	92.2 (59)		70.9 (39)	
Medicare Advantage	85.1 (80)		66.7 (6)	
Medicaid	100 (10)		70.8 (51)	
Other	83.3 (6)		100 (5)	
Laterality, % (n)		0.774		0.849
Right	87.6 (120)		73.9 (82)	
Left	88.7 (118)		75.0 (81)	
Kellan Laurence grade, % (n)[1]		0.597		0.031
2	100 (2)		0 (0)	
3	95.2 (20)		88.2 (15)	
4	87.8 (215)		74.4 (148)	
Second surgery		0.606		0.537
No 2nd surgery	88.9 (193)		75.0 (132)	
2nd surgery < 6 months	86.7 (13)		61.5 (8)	
2nd surgery > 6 months	84.2 (32)		76.7 (23)	
Distance from PT office, % (n)[1]		<0.0001		1.000
<40 km	92.0 (208)		74.4 (145)	
≥40 km	66.7 (24)		72.2 (13)	

Distance effect on PT engagement

Table 2A. Physical therapy (PT) attendance of two or more visits within the system after TKA (n=239).
CI = confidence interval; TKA = total knee arthroplasty.

The overall distance effect was p=0.008

Distance from PT office	Rate (95% CI)
<20 km	93.1% (87.5, 96.2)
≥20 to <40 km	90.2% (81.6, 95.1)
≥40 to <60 km	71.4% (32.5, 92.9)
≥40 to <80 km	71.4% (32.5, 92.9)
≥80 to <100 km	66.7% (33.2, 89.0)
>100 km	61.5% (34.2, 83.1)

Results

- Analysis showed that increasing distance to clinic negatively impacted engagement with PT (p= 0.008). 92.0% (208) individuals residing within 40 km engaged in PT, whereas 66.7% (24) of individuals residing greater than 40 km from PT office engaged in PT (p = <0.0001).
- This association was not seen when analyzing PT completion (p = 1.000).
- There was a significant association between completion of PT and race (p = 0.036). White patients (101, 80.8%) were more likely to complete PT when compared to black (55, 67.1%) or other (12, 58.3%) patients.
- Higher Kellan Laurence Grade preoperatively was associated with a decrease in patients completing PT (p = 0.031)

Discussion

- PT clinic referral pre-operatively may be an important predictor of creating patient engagement, especially among patients residing >40 km from PT facility.
- Lack of significance between distance and completion of PT further emphasizes the importance of pre-operative planning for rehabilitation
  - Patients living in rural areas are caught between wanting access to the best resources vs seeking more local care and being more likely to engage in their care
- Kellan Laurence grade could be used to screen for patients needing extra follow up to complete PT
- Further investigation into why black patients were less likely to complete PT is needed as it is likely a complex issue based on multiple social determinants of health
  - Physicians and physical therapists can use this observation to tailor care to patients of different racial backgrounds, dedicating more time and planning to patients who may be more likely to not complete their care