Evaluating Gender, BMI And Age Factors that Influence Mid Term Outcome of Primary Total Knee Replacement: A Single Centre Analysis of 595 Knees

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INTRODUCTION:

Total knee replacement surgery permits patient with poor functional capacity to live independently without pain and with good functionality. Some studies found an inverse relationship between factors such as BMI, age, and its functional outcome[1,2]. Gender was reported as one of the factors too, affecting the functional outcome post TKR[3]. This study is performed to evaluate factors affecting good functional outcome after primary TKR for knee OA in men and women.

METHODS:

All patients underwent primary total knee replacement surgery at a single institution between 2007 and 2020 were identified from a prospective arthroplasty database. 595 patients were included in the study. Age, gender, BMI, pre- and post-operative functional scores (KOOS scores) were collected for analysis purpose. Figure 1 showed the cut-off point of "good functional outcome" as defined as PASS (Patient Acceptable Symptom State)[4].
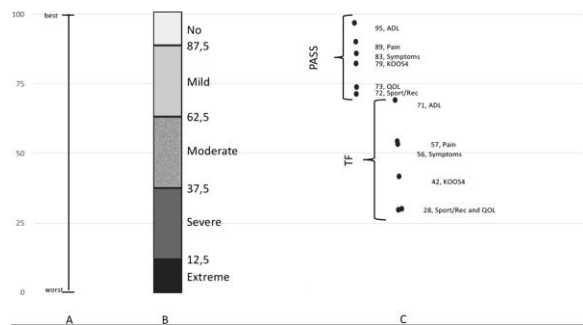

Figure 1: KOOS Scoring Interpretation
A. KOOS is scored on a 0–100, worst to best, scale. Interpretation of KOOS scores exemplified using different thresholds; B. average response categories based on wording on Likert scale used to respond to individual KOOS items, and C. Patient Acceptable Symptom State (PASS) and Treatment Failure (TF) thresholds.

RESULTS:

The mean follows up duration of the patients was 64 months with standard deviation of 42 months. The longest follow up period was recorded as 194 months. Paired sample t-test showed significant improvement of all KOOS functional sub-scores (ain, symptom, ADL, sports and quality of life) pre and post-surgery at midterm follow up ($p<0.001$).

Table 1: Subject Demographics (n=595)

Variable	n (%)	Mean (sd)
Age (years)		64.1 (8,38)
Gender		
Male	125 (21.0)	
Female	470 (79.0)	
BMI (kg/m²)		29.01 (5.30)

KOOS Sub Scores	Pain (>89)		Symptom (>83)		ADL (>95)		Sports > 72		QoL >73	
Variables	OR	P-value	OR	P-value	OR	P-value	OR	P-value	OR	P-value
Age	1.007	0.810	0.969	0.293	1.002	0.879	0.991	0.526	0.987	0.692
Gender										
Male	1		1		1		1		1	
Female	*3.890*	*0.005*	*4.854*	*0.001*	2.984	0.084	1.43	0.196	1.436	0.546
BMI	0.997	0.540	1.006	0.909	1.016	0.510	0.992	0.950	0.999	0.985

Note: sd = standard deviation;; BMI= Body Mass Index

Table 2: Factors affecting good midterm KOOS functional outcome post TKR surgery
Note: Presented as Multiple Logistics Regression; OR = adjusted Odd Ratio

DISCUSSIONS:

The study suggests that age and BMI do not significantly impact the functional outcome of TKR surgeries. However, it highlights that gender plays a significant role, with females showing higher odds of achieving good functional outcomes, particularly in terms of KOOS pain and symptom sub scores, compared to males. This finding aligns with several other studies indicating that female patients tend to experience greater improvement in knee-related functional scores and recover faster in the early stages following TKR surgery[5,6].

CONCLUSION:

Female showed to have higher odds of achieving good functional outcomes in term of KOOS pain and symptom post TKR surgery. Notably, the study found that age and BMI did not exert a significant influence on these outcomes. Consequently, patients should not be denied total knee replacement surgery based age or BMI alone.