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Patient Outcomes after Total Knee Arthroplasty in Patients Older than 75 Years with those below 75 Year: A Prospective & Retrospective Study

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Abstracts: ***Background: Osteoarthritis (OA) is the most common joint disease in the world, with the increase in both incidence and prevalence associated with increasing age. (1) The purpose of this paper was to analyze the patient outcomes after total knee arthroplasty in patients older than 75 years, both from a prospective & retrospective aspect. Materials and methods: A prospective and retrospective study was conducted for a period of 12 months among 40 Patients operated with end stage arthritis of knee at Max Super Speciality Hospital, Ghaziabad. The primary outcome variable is quality of life (QOL). Results: For the healthy person who is more than 75 years, TKA provides pain relief and functional improvement, comparable with benefits in the younger patient population, and this is also reflected in similar health related quality of life gains. Conclusion: With increasing life expectancy and elective surgery improving the quality of life, age alone is not a factor that affects the outcome of TKA and should not be a limiting factor when deciding who should receive this surgery.***

Keywords: Osteoarthritis, Quality of life, Pain relief, functional improvement.

1. Introduction

Osteoarthritis (OA) is the most common joint disease in the world, with increase in both incidence and prevalence associated with increasing age. [(1)] It is the second most common cause of disability in the elderly, second only to cardiovascular disease. In fact, more than 75% of persons above 70 years of age show some radiographic evidence of osteoarthritis. For radiological knee osteoarthritis these estimates are somewhat higher, even at a younger age (45 years and over)- 14.1% for men and 22.8% for women.[(2)] The triad of increasing numbers of elderly people, obesity, and lack of exercise is likely to have a significant effect on the burden of osteoarthritis. In advanced osteoarthritis, total knee replacement provides a safe, well tolerated and cost effective treatment. The proportion of population aged > 75 years old is expected to increase globally, meaning the elderly will makeup a significant proportion of elective Total Knee Arthroplasties (TKAs) in coming days. Factors that influence the outcomes of TKA include gender and degree of comorbidity including mental health status. Studies have found perioperative mortality rates of approximately 0.3% among TKA. Composite major complications within 90 days of admission were 3.1% for TKA. [(3)] The impact on QOL and satisfaction in relation to expectations are gaining attention day by day as strong indicators for evaluating the results obtained subsequent to TKA. These two parameters are the only ones capable of presenting the results from patient's own point of view.

2. Materials and Methods

Study Area
In patient department**,** Max Super Speciality Hospital, Vaishali, Ghaziabad, U.P.

Study Design
A prospective and retrospective study

Study Duration
12 months

Data Collection
Patient details is collected from the case records and the investigation reports

Study Population
Patients operated with end stage arthritis of knee in Max Superspeciality Hospital, Vaishali, Ghaziabad, U.P. during June 2016- Dec 2018.

Inclusion
- All patients presenting to the OPD with end stage arthritis of knee joint.
- Patients who have given informed written consent to be a part of this study.

Exclusion
- Patients who have undergone any previous surgery at knee joint
- Patients having congenital deformity of one or both the lower limbs
- Patients having pathological fracture or tumour around the knee joint
- Patients with concomitant hip or spine deformities
- Patients who have not given informed written consent

Sample Size: minimum of 40 joints
The nearest study we could able to locate is by Razzak et al. [(5)] who reported mean change in SF-36 score is 45 points with the Standard deviation of 20 points.

Using this information, with margin of error of 5 points on either side, and confidence level 95%, the sample size comes to 62 as per the following formula-

$$\pi = \frac{Z^2\alpha / Z^2\sigma}{L^2}$$

Where L=5
α=20
And
$Z\frac{\alpha}{L}$ =1.96 corresponding to 95% confidence level

However, because of limitation of time we proposed to take sample of 40, in each group (less than 75 year & more than 75 year).

The study population is divided into two equal groups, aged 75 year or above compared with aged less than 75 years.

All surgery are performed by the same surgeon, at same centre, with the posterior cruciate ligament sacrificing (PS) implants.
The data is recorded on a prefixed Performa which included relevant data of the patient, history, preoperative assessment, complications and follow-up assessment.

Statistical Analysis Methods
Percent of cases and knees with age < 75 years and age > 75 years in different gender, diagnosis, pre op knee examination, pre op medical comorbidities and type of implant was computed and reported. For Post op complications such as cardiac, neurological, renal, pulmonary and surgical comparison is made by chi-square test or Fischer exact test, when the no. of knees in different category is less than five. For parameters such as Hb level, LOS, ROM, and improvement in quality of life parameters such as physical function, emotional well being etc. is compared by two sample: Student 't' test. A p-value of <0.05 is taken as statistically significant. All the calculations were done with help of SPSS 21 package.

Financial Inputs and Funding
The study is neither funded by any pharmaceutical company nor institution.

Ethical Considerations
The protocol of the study was submitted to the Ethical and Scientific Committee of Max superspeciality Hospital, Vaishali, Ghaziabad, UP before initiating the study. After approval by the committee, the study is initiated at our institution. A voluntary informed consent in writing was obtained from the patient/legal guardian prior to enrolment in the study program.

3. Results

Table 1: Gender distribution of study population showed that in less than 75-year age group 6 (30%) patients were male and 14 (70%) were female. While in age group more than 75 years 8 (40%) were male and 12 (60%) were female.

Table 2 - In study population of group less than 75 years of age 34 (85%) knees diagnosed as a OA, 2 (5%) were PA , 4 (10%) were RA , while in more than 75 years age group all knees 40 (100%) were suffering from OA.

Table 3: In both groups majority knees had Varus deformity in pre op knee examination.

Table 4: 26 knees having Hypertension, 6 cases of CAD, 4 knees of Bronchial Asthma, 2 knees of Pulmonary TB, 2 knees of epilepsy, 2 knees of CKD, 2 knees of Psoriasis, 8 knees having Diabetes and 16 knees of hypothyroidism in younger age group while 28 knees of hypertension, 6 knees of COPD, 4 knees of parkinsonism, 16 knees having Diabetes and 8 knees of Hypothyroidism in elderly age group.

Table 5: In study population of group less than 75 years of age Maxx implant used in 18 (45%) Knees, S&N implant used in 22 (55%) Knees, while in more than 75 years age group Maxx implant used in 22 (55%) Knees and S&N implant used in 18 (45%) Knees.

Table 6: In our study on the basis of SF-36 Questionnaire, we measured the scores at pre op, 12 months and the mean difference of 12 month-pre op score of eight health concepts, the mean score of physical function in pre op was 25.5±5.03, at 12 months 87.5±2.52 and the mean difference was 62.25±2.51 in younger age group while in elderly group at pre op 27.01±4.64, at 12 months 84±19.65 and mean difference was 57±20.34. We measured the p-value of mean difference and it is more than 0.05, so mean difference for Physical functioning between the groups is not statistically significant.

The mean score of Role limitations attributed to physical problems in pre op it was 0±0, at 12 months 100±0 and the mean difference was 100±0 in younger age group while in elderly group at pre op 0±0, at 12 months 95±22.07 and mean difference was 95±22.07. We measured the p-value of mean difference and it is more than 0.05, so mean difference for Role limitations attributed to physical problems between the groups is not statistically significant.

The mean score of Role limitations attributed to Emotional problems in pre op was 0±0, at 12 months 100±0 and the mean difference was 100±0 in younger age group while in elderly group at pre op 0±0, at 12 months 96.66±14.72 and mean difference was 96.6614.72. We measured the p-value of mean difference and it is more than 0.05, so mean difference for Role limitations attributed to Emotional problems between the groups is not statistically significant.

The mean score of energy/ fatigue in pre op was 50.75.5±5.83, at 12 months 61.5±3.87 and the mean difference was 10.75±5.31 in younger age group while in elderly group at pre op 49.25±8.95, at 12 months 56.25±8.82 and mean difference was 7±12.49. We measured the p-value of mean difference and it is more than 0.05, so mean difference for Energy/ fatigue between the groups is not statistically significant.

The mean score of Emotional wellbeing in pre op was 46.4±4.03, at 12 months 43.4±10.5 and the mean difference was 3±6.51 in younger age group while in elderly group at pre op 41.6±3.73, at 12 months 46.4±10.82 and mean difference was 4.8±7.74. We measured the p-value of mean difference and it is more than 0.05, so mean difference for Emotional wellbeing between the groups is not statistically

significant.

The mean score of Social function in pre op was 47.01±9.11, at 12 months 34.12±20.02 and the mean difference was 62.25±2.51 in younger age group while in elderly group at pre op 38.01±14.88, at 12 months 40.75±20.66 and mean difference was 57±20.34. We measured the p-value of mean difference and it is more than 0.05, so mean difference for Social functioning between the groups is not statistically significant.

The mean score of Pain in pre op was 34.87±15.43, at 12 months 69.5±17.05 and the mean difference was 34.62±20.44 in younger age group while in elderly group at pre op 45.75±20.33, at 12 months 66.62±18.85 and mean difference was 14.87±32.85. We measured the p-value of mean difference and it is more than 0.05, so mean difference for Pain between the groups is not statistically significant.

The mean score of General health in pre op was 47.75±2.52, at 12 months 75±0 and the mean difference was 27.25±2.51 in younger age group while in elderly group at pre op 48.5±2.32, at 12 months 73.15±8.16 and mean difference was 24.65±8.81. We measured the p-value of mean difference and it is more than 0.05, so mean difference for Pain between the groups is not statistically significant.

4. Discussion

The results of our study shows that the improvements in all eight concepts of quality of life (SF-36). There are multiple studies demonstrating a clinically meaningful improvement in their self-reported physical health relative to their baseline. Michele Fang et al in his study the effect of advancing age on total joint Replacement outcomes concluded that, improvements in patient related outcomes were similar across all age groups [3]. Scott et al found that younger age was associated with improved with fulfillment of TKA expectations, but both older and younger patients had similar postop expectations[28]. Allyson jones et al in his prospective cohort study the effect of age on pain, function, and quality of life after TKA demonstrated that, patients 80 years or older reported significant pain relief and functional improvement as well as positive gains in health related quality of life that were comparable with those of patients aged 55 to 79 years[18]. Most studies focusing on elderly patients have documented good surgical outcomes. In a retrospective study of 74 patients aged 75 years or older who underwent knee replacement, 83% reported their knee was "much better" after surgery, 79% were satisfied with their outcome, and 92% stated they had made the right decision about surgery. In a study that included 50 patients aged 80 years or older and 50 patients aged 65 to 69 years, 2 years after surgery, pain and functional status were similar in the 2 age groups, but more patients in the older group relied on mobility aids. In a survey of 487 Medicare1 beneficiaries at least 65 years old (including 160 who were 80 years old) who had knee replacement, patients reported improvement in their ability to walk and climb stairs and high satisfaction with surgery [9]. Similar to our study, a number of studies have found that older age was not associated with worse outcomes from joint replacement.

Table 1: Gender distribution of study cases

Gender	Less than 75 years (n=20)		≥75 years (n=20)	
	No.	%	No.	%
Male	6	30.0	8	40.0
Female	14	70.0	12	60.0

Table 2: Diagnosis in study Knees

Diagnosis	Less than 75 years (n=40)		≥75 years (n=40)	
	No.	%	No.	%
OA	34	85.0	40	100.0
PA	2	5.0	0	0.0
RA	4	10.0	0	0.0

Table 3: Pre-op Knee examination in study Knees

Pre-op Knee examination	Less than 75 years (n=40)		≥75 years (n=40)	
	No.	%	No.	%
Varus	39	97.5	37	92.5
Valgus	1	2.5	3	7.5

Table 4: Preop medical comorbidities in study Knees

Pre-op medical comorbidities	Less than 75 years (n=40)		≥75 years (n=40)	
	No.	**%**	**No.**	**%**
Cardiac				
HTN	26	65	28	70
CAD	6	15	0	0
Pulmonary				
Bronchial Asthma	4	10	0	0
TB	2	5	0	0
COPD	0	0	6	15
Neurological disorder				
Epilepsy	2	5	0	0
Parkinsonism	0	0	4	10
Renal				
CKD	2	5	0	0
Psoriasis	2	0	0	0
Endocrine disorder				
DM	8	20.0	16	40.0
Hypothyroidism	16	40	8	20

Table 5: Type of Implant in both groups

Type of implant	Less than 75 years (n=40)		≥75 years (n=40)	
	No.	%	No.	%
Freedom Maxx	18	45	22	55
Smith and Nephew	22	55	18	45

Table 6: Comparison of mean of different variables of Quality of life

SF-36 parameters	Less than 75 years (n=40)		≥75 years (n=40)	
	Mean	SD	Mean	SD
Physical functioning				
Pre op	25.5	5.03	27.01	4.64
At 12 months	87.75	2.52	84	19.65
Mean difference (post-pre)	62.25	2.51	57	20.34
Limitations due to Physical Health				
Pre op	0	0	0	0
At 12 months	100	0	95	22.07
Mean difference (post-pre)	100	0	95	22.07
Lim due to Emotional Problems				
Pre op	0	0	0	0
At 12 months	100	0	96.66	14.72
Mean difference (post-pre)	100	0	96.66	14.72

Energy/Fatigue				
Pre op	50.75	5.83	49.25	8.95
At 12 months	61.5	3.87	56.25	8.82
Mean difference (post-pre)	10.75	5.31	7	12.49
Emotional Well Being				
Pre op	40.4	4.03	41.6	3.73
At 12 months	43.4	10.5	46.4	10.82
Mean difference (post-pre)	3	6.51	4.8	7.74
Social Functioning				
Pre op	38.56	16.81	30.31	16.52
At 12 months	54	4.962	53.5	9.21
Mean difference (post-pre)	15.43	17.703	23.18	18.11
Pain				
Pre op	34.87	15.43	45.75	20.03
At 12 months	69.5	17.05	60.62	18.85
mean difference (post-pre)	34.62	20.44	14.87	32.85
General Health				
Pre op	47.75	2.52	48.5	2.32
At 12 months	75	0	73.15	8.16
Mean difference (post-pre)	27.25	2.51	24.65	8.81

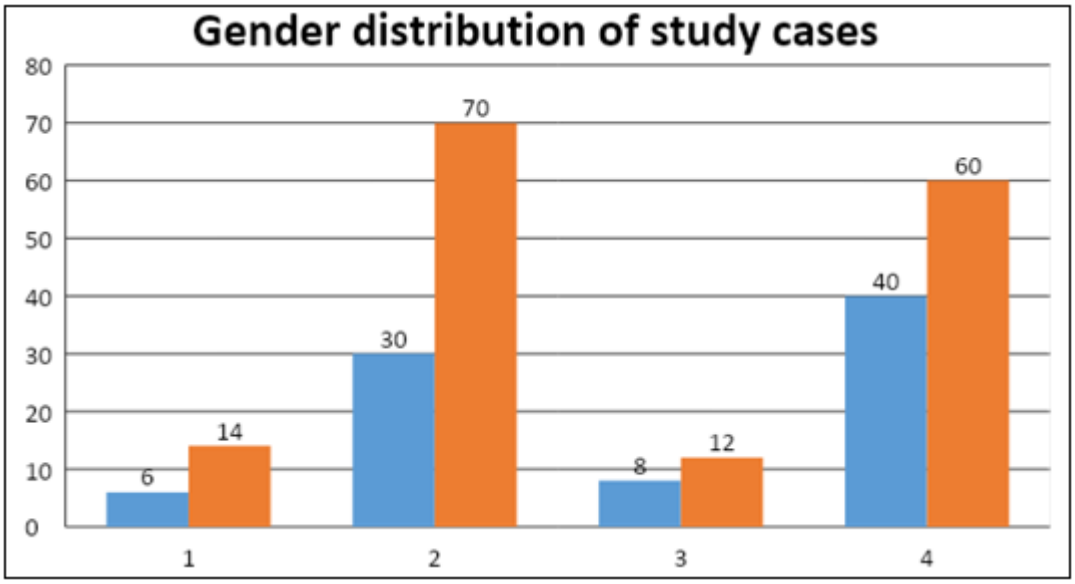


Figure 1

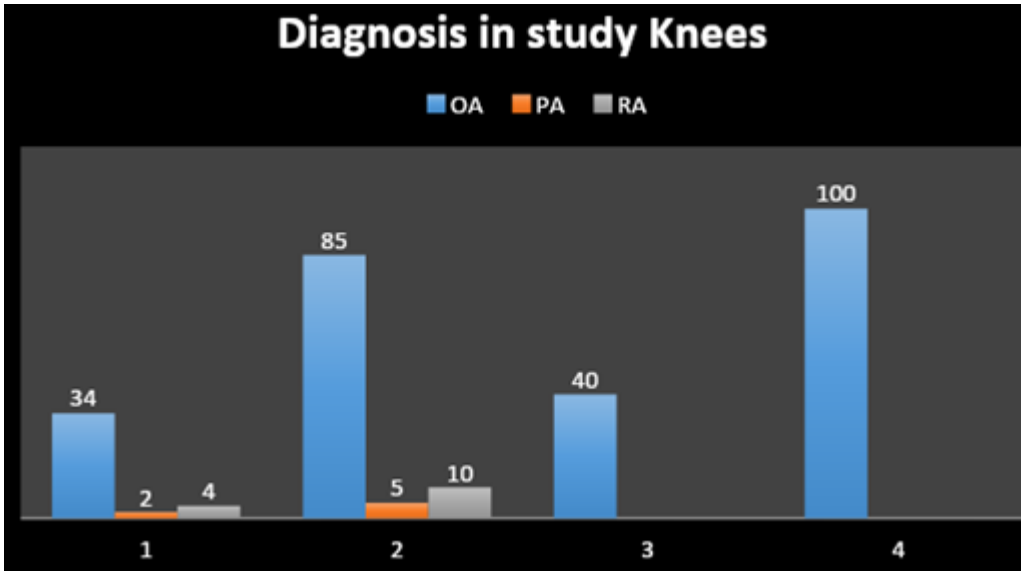
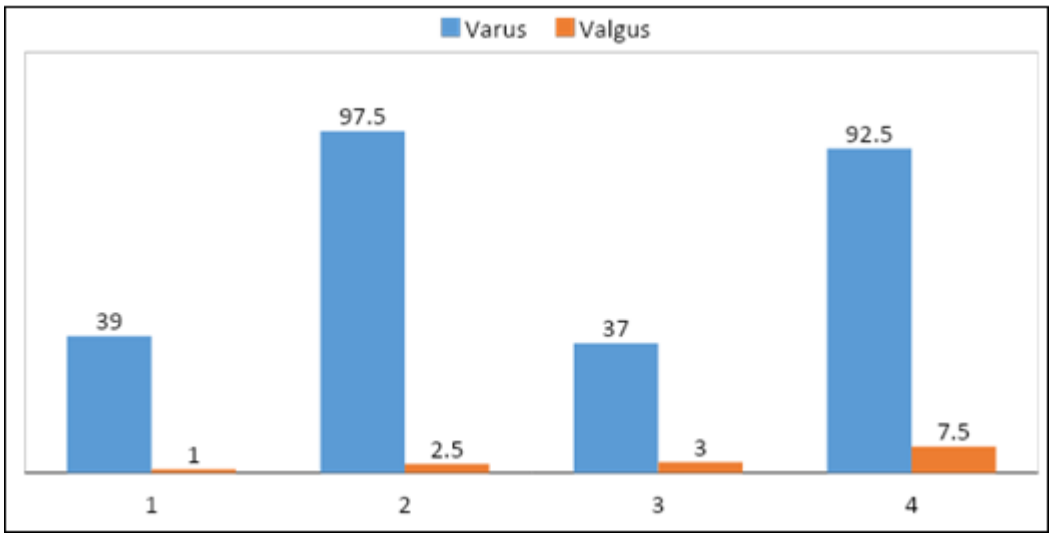


Figure 2



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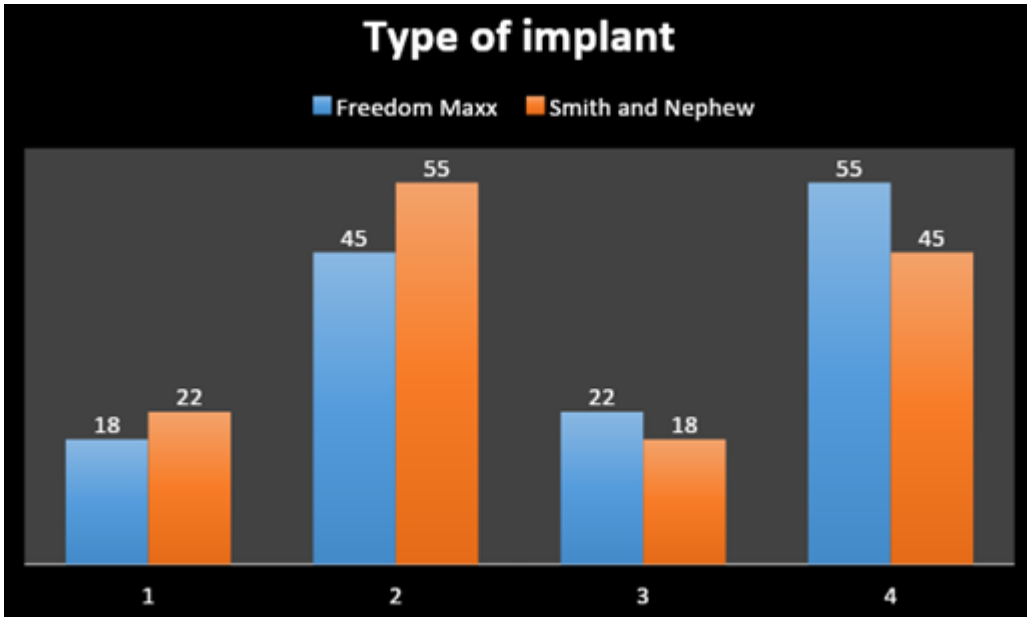

Figure 4

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